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Next Month....

A special article on British jams and pickles in the August issue of The Food Industries Journal will be of particular interest to the manufacturers of these mouth-watering items in this country which exports them to several countries, including the United States.

Also in the next issue will be presented an article on new machines of interest to the food industry written by a British expert.

Our staff men are on the job and the August issue will carry an article on cottonseed oil which will be of interest to vanaspati manufacturers.

Of particular interest to those engaged in exporting seafoods is an informative and thought-provoking article on the development and export potential of the seafood industry by Mr. V. M. Srikumaran Nayar, Chairman of the Marine Products Export Promotion Council.

And, of course, our regular features like Focus on Research, Food News and Personalia will all be there.

Do not miss the August issue of The Food Industries Journal.

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Editorial

Protein Malnutrition

THE international symposium on "Protein Foods and Concentrates" held in Mysore this month has, as is only to be expected, aroused some public awareness of the problem. This by itself is a great achievement. If the initial enthusiasm is not to die down it is essential that it must be followed up by purposeful action.

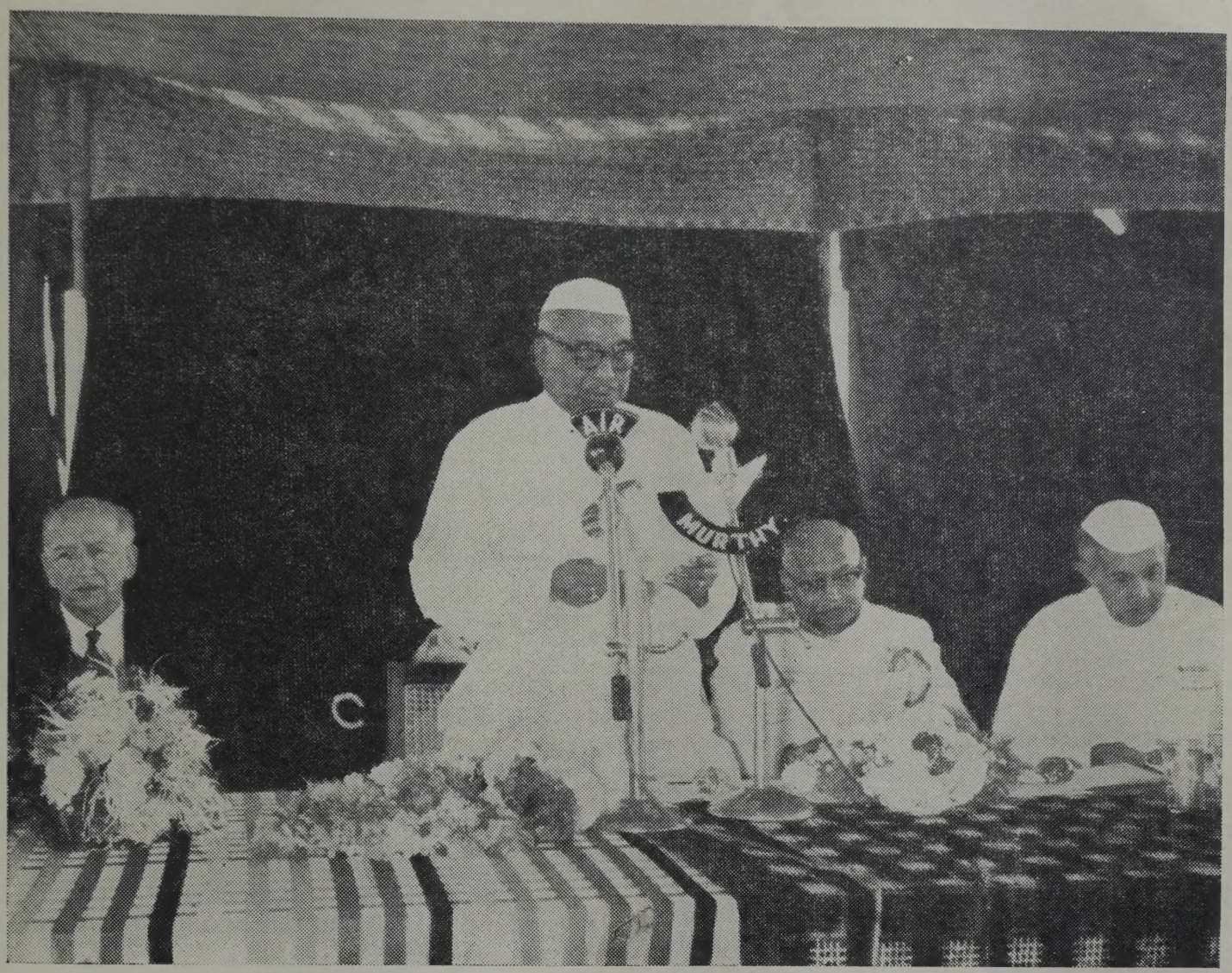
There is little doubt that in few countries is the production of protein foods more urgent than in India. Indian food is extremely deficit in protein and the enormous size of its population heightens the urgency of coming to closer grips with the problem of producing protein-rich foods. If anything, the problem is further complicated by the low level of incomes. As the Union Food and Agriculture Minister, Mr. Jagjivan Ram, pointed out in his inaugural address, the problem is essentially one of producing protein-rich foods at prices well within the purchasing power of the people.

There is no need to overdramatise an already grim problem. The report submitted recently by the UNESCO Advisory Committee on the Application of Science and Technology to Development entitled "Increasing the production and use of edible protein" brings out some glaring facts about the protein supply in the world. In India, the per capita calorie requirement is 2,240 whereas the per capita calorie consumption is no more than 2,030. In contrast the American calorie requirement is 2,600 while their average calorie consumption is as high as 3,090.

It is essential that some determined steps should be taken towards setting up larger and better facilities for the manufacture of protein foods. The UNESCO committee on its part has done well to make several specific suggestions for improving the availability of protein in developing countries and also to work out the cost of implementing them. The committee has suggested that the U.N. specialised body should spend $ 1½ million per year over the next ten years for development and cultivation of high-protein plants and another $ 20 million per year should be available for this purpose by way of long-term investment. It has also stressed the need for spending $ 1.5 million per year over the next decade for making protein-rich foods from oilseed meals and another $ 750,000 on research on these foods.

By far the best source of protein in developing countries is oilseeds. It is known that oilseed residues have large nutritional value. But it continues to be used largely for animal feeding by which four tons of vegetable protein yield only one ton of animal protein. It should be possible to set up plants in developing countries for converting oilseed meal into protein-rich food.

In India, much good work on evolving sound schemes for protein-rich foods has been done by the Central Food Technological Research Institute in Mysore. Several States have already taken up these schemes in hand. There is, however, great scope for better and fuller exploitation of the results of research. Given the right facilities it should be possible for the Indian food industry to set up more plants for making protein-rich foods.



The Union Minister for Food and Agriculture, Mr. Jagjivan Ram, inaugurating the International Symposium on Protein Foods and Concentrates in Mysore on June 27. (L. to R.): Dr. Z. I. Kertesz of the Protein Advisory Group of FAO, WHO and UNICEF; the Chief Minister of Mysore, Mr. Nijalingappa; and Mr. P. A. Narielwala, Chairman, Organising Committee.

MYSORE SYMPOSIUM SUGGESTS STEPS TO FIGHT PROTEIN MALNUTRITION

AN event of far-reaching importance to India—and all under-developed nations of the world—was the seven-day International Symposium on Protein Foods and Concentrates held at the Central Food Technological Research Institute (CFTRI), Mysore. About 150 specialists (70 of them from abroad) from research organisations and industries of 22 countries shed revealing light on the developments taking place in different parts of the world in the field of protein foods derived from unusual sources like oilseeds and legumes and protein concentrates and isolates.

The Union Food and Agriculture Minister, Mr. Jagjivan Ram, inaugurated the symposium on June 27. It was sponsored by the Council of Scientific and Industrial Research (CSIR) of India and the Office of International Research, National Institutes of Health, U.S.A., and co-sponsored by the FAO with the active participation of the World Health Organisation and the Association of Food Technologists, India.

MINISTER'S ADVICE

In a short speech Mr. Jagjivan Ram noted the general protein malnutrition in India and said the exploitation of legumes and oilseeds, in particular, to meet protein deficiency would not only improve the quality of food but also make up for a sizable chunk of the food shortage. He pointed out that India was fortunate in producing annually 12 million tonnes of legumes. The production was increasing.

Welcoming the Union Minister, the Mysore Chief

Minister, Mr. S. Nijalingappa, who presided, and the delegate, Mr. P. A. Narielwala, Chairman of the Organising Committee, said while techniques and formulations for producing edible protein foods were now available, it was for industry the world over to pioneer the production of these high protein foods in a spirit of dedication.

In a message, the Director of UNICEF for South Central Asia, Dr. Charles A. Egger, announced that the UNICEF Executive Board had approved a project for the production and distribution of low-cost protein-rich supplementary food for weanlings and young children in India, and had allocated 780,000 dollars (Rs. 58-50 lakhs) to assist the project for a period of two years.

Mr. Nijalingappa invited industrialists to start high protein food manufacturing units in Mysore and assured all assistance from the State Government.

An exhibition organised at the CFTRI in connection with the symposium was declared open by Mr. Jagjivan Ram. Protein sources and processed foods were displayed by food industries in India and abroad. Demonstration of some of the processes had been arranged in the pilot plant unit of CFTRI.

TECHNICAL SESSIONS

In the technical sessions, the delegates discussed the processing, consumer acceptance and marketing of protein foods in developing countries, with special reference to South-East Asia. The need for legislative support for protein food enterprises and the removal of Government restrictions retarding the development of the industry were emphasised by the experts.

The delegates said it was necessary to make available low-cost protein concentrates which could be included in the diet without any change in the food habits of the people. Many complained that despite extensive studies on the production of high protein foods, they were not available at low prices.

During the discussion on increasing supplies of protein foods by using new sources, it was pointed out that improved quality protein foods could now be produced from groundnut, soyabean, cottonseed and fish. Their use would not only meet the need of high protein food but would also partially meet the general food shortage in the developing countries.

FISH PROTEIN CONCENTRATES

Delegates urged high priority to the production of fish protein concentrates in countries with marine resources. The surplus edible varieties of fish and other varieties which do not find a market could be coverted into fish protein concentrates.

The participants in the symposium were told that the technological problems involved in producing high quality cottonseed flour for human consumption had been solved and it could now be produced economically.

After a discussion on the production of protein-rich concentrates from vegetable sources like groundnut, coconut and green leaves, the symposium recommended that the study of groundnut protein isolate should be encouraged as it would be a very useful raw material for baby foods and could replace milk protein.

Research on improving methods of obtaining cheap coconut meal without damage to protein content was also recommended.

Texts of speeches on Page 33–36.

The recommendations of the symposium will be published in detail in the August issue of *The Food Industries Journal.*

NEW AUTOMATED BUTTER FACTORY

A new factory costing over half a million pounds for processing up to 113,650 litres of cream per day into dried milk and butter at the rate of 1,450 kg. per hour has been opened in New Zealand. The plant, which requires a staff of only four men, incorporates an automated cleaning system engineered and supplied by **The A.P.V. Company Ltd.**, Crawley, Sussex.

Cream from two 272,75 litre storage tanks is fed to one or both of two APV "Paradisk" cream treatment units where weed flavours are removed and acid content neutralised before the cream passes to one of four finished creams storage tanks. Feeding from these tanks to the butter churns is controlled from sub panels adjacent to the churns, as is the flow of buttermilk from the churns to the dried milk processing plant.

The cleaning of all tanks and pipelines is card controlled from the main panel. Detergent, sterilant and acid is recovered from the entire cleaning circuit and returned to bulk tanks. Since one section of the system may be carrying product while another is being cleaned, safeguards are incorporated to prevent intermixing. The one hundred and five air-operated APV 'Zephyr' valves controlling the various flows are fitted with micro-switches which signal back to the control panel the actual position of each valve. A system of interlocks ensures that no flow is permitted unless each valve is in its correct position for that particular sequence.

MEETING WORLD PROTEIN NEEDS-II

By Dr. MAX MILNER

This is the second of two articles by Dr. Max Milner on the critical challenge of world protein needs and research being carried out to discover new sources of protein. Dr. Milner, an adjunct professor of nutrition sciences at Columbia University, is senior food technologist for the United Nations Children's Fund and currently serving as chief of Nutrition Branch, Office of Technical Cooperation and Research, U.S. Agency for International Development. The first article was published in the June issue.

SINCE infants and young children are the primary victims of protein malnutrition, an important clinical and practical question has needed to be answered: Could protein-rich materials previously unused for human food be upgraded into products that are safe and effective in infant and child feeding?

Extensive clinical and pediatric research during the past 15 years, much of it conducted in tropical and subtropical areas, has answered this question. When certain plant proteins are produced in a hygienic manner and combined with traditional staple foods or with each other the mixtures are virtually equivalent to animal protein in supporting normal growth and development in infants and young children.

These findings then focussed attention on the following question: Is there technology for producing food-grade products that can be adapted to the conditions and needs of developing countries? The answer to our question is "yes."

PROTEIN CURD

In the case of soybeans, considerable experience of value exists in the traditional food processing of South-East Asia. In order to remove the bitter flavour of the seed, as well as anti-nutritional factors such as that which interferes with digestive enzymes, most oriental procedures begin by extracting the ground beans with water. This extract, or "milk", is cooked and a protein curd (tofu) is then precipitated by means of calcium and magnesium salts (obtained traditionally from sea water). The curd, analagous to cottage cheese, can be gathered and eaten as such, or it may be mixed with cereals and fermented by various bacterial cultures. Tempeh, of Indonesian origin, is made by fermentation with Rhizopus fungus of soaked, dehulled beans followed by deep-fat frying. All such products are useful protein foods, and some have considerable appeal to the non-oriental palate.

Nevertheless, the processes used to make these products are frequently not easily or economically transferable to larger-scale or industrial processing. In the case of soy "milk", however, a bottled, heat-sterilized version which requires no refrigeration is becoming popular in some of the urban centres of South-East Asia. A spray-dried soy "milk" has been marketed in Indonesia for several years.

HEAT-PROCESSED SOY FLOUR

The most economical processing of soybean into animal food originated in the United States, by controlled application of steam and heat, with or without solvent defatting. These defatted, heat-processed or "toasted" soy grits or flours, which contain 50 per cent protein or more, are palatable and are of a biological quality approaching that of animal sources. They are currently available at five to six cents per pound (dry weight) and are unquestionably the cheapest form of good-quality protein available today. Another form of this product is a full-fat flour made by a cooking technique that retains all the desired components.

The United States, in its Agency for International Development (AID) and in its Food for Peace programme, is sponsoring, in several developing countries, acceptability tests of these soy products in the form of dry-soup bases, gruels, and beverage powders. These soy products, mixed with cereals, are already in use as the major protein mixtures in several countries, including Brazil, Colombia and Taiwan.

Considerable research is in progress to further improve the palatability and diversity of soy foods. Highly palatable and gastronomically attractive products made from spun soy protein fibres to resemble the texture of meat are a recent development of this effort.

Edible cottonseed protein concentrates of good nutritional quality are now being produced in the United States, Colombia, El Salvador, India and Peru. Careful processing is required to remove or minimise the toxic effects of a component of the seed. The Institute of Nutrition for Central America and Panama, in Guatemala, has originated simple, economical cereal mixtures containing heat-processed cottonseed flour as the major protein component. These are being marketed in Central America, Colombia and Venezuela as a nutritious weaning food or as a popular beverage base.

SELECTION OF GROUNDNUT

Groundnut flours of food quality can be produced if oilseed processes are modified to conform to sanitary conditions required for food production. It is

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necessary to select only sound, well-matured nuts, inasmuch as nuts which have been attacked by certain common fungi, because of prolonged dampness during harvesting, can be toxic.

WEANING SUPPLEMENT

In Nigeria, a protein concentrate consisting of three parts of defatted groundnut flour to one part of dry skim milk is becoming popular as a weaning supplement. In India, the Central Food Technological Research Institute at Mysore has developed and tested a number of foods based on groundnut flour in mixtures with milk, legumes, careals, or with other oilseed proteins.

Chapati is improved in palatability by such supplementation. The increasing milk shortage in that country has prompted proposals to augment liquid milk supply by means of groundnut protein isolate or groundnut flour. Even with two parts groundnut protein to one part milk protein the resulting mixture is as nutritious as cow's milk itself.

The animal protein resources of the sea are said to be inadequately managed and exploited for food use. Increasing attention is being given to perfecting technology for the production from fresh whole fish of dried, defatted, and deodorised (that is, essentially tasteless) fish protein concentrates, by means of rather complex industrial-scale technology. Pilot plants have been built in a number of countries to produce this product, which contains 72-75 per cent protein and, if carefully processed, can be of very high nutritive value and quite bland in flavour. Fish flour may be used as a protein supplement in cereal foods as macaroni, bread and weaning mixtures.

ANIMAL RATIONS

In several agriculturally efficient countries increasing amounts of synthetic amino acids (protein components) are used to impove the amino acid balance of animal rations, particularly poultry feeds, which contain plant materials almost exclusively. The resulting increase in nutritive value of the ration and the higher efficiency of food utilisation lower the cost of producing protein. This sound practice is equally applicable to the improvement of human diets, although more information is needed on ways to apply it.

For as long as 25 years in several economically advanced countries, cereal foods have been routinely enriched with synthetic B vitamins, calcium and iron. Marked improvement in public health has been noted since the introduction of this practice. It is clear, however, that in order to be effective, foods so enriched have to be produced in centralised industrial plants where controlled addition of supplements is feasible. Thus urban populations, where such plants are located, benefit immediately from such practice.

Improving protein quality by plant breeding has a great potential. A recent break-through at Purdue University, Indiana, has demonstrated a major upgrading in the protein nutritive value of maize. This has instigated a search for genes of other cereals, such as wheat, rice, and sorghum, that could bring about nutritive improvement in their protein.

ALGAE BY POND CULTURE

Protein can be produced by processes which would require the use of only limited areas of land. Some of these processes are receiving serious attention in terms of research and practical development.

One that has been given considerable publicity is large-scale production of an algae by pond culture. Pilot plants have been operating in Japan and in the United States to produce an animal-grade product. As yet, the cost of production is too high to justify starting, for example, a poultry industry based on this material as a feed resource.

In England, two mechanical processes have been developed to harvest protein from fresh green leaves. One of these, devised for village-scale industry, presses out the juice and precipitates from it a green protein curd of good nutritive value. The other procedure is adapted to larger industrial scale. A large pilot plant operating in Israel is now exploring the economics of the process, and a commercial-scale plant operating in England is producting and marketing a bland protein-oil mixture derived from groundnut.

FERMENTATION METHOD

Large-scale production of fungi, yeasts and bacteria as protein concentrates by fermentation is receiving widespread attention. A major European petroleum refiner has put into operation in France a large pilot plant to produce yeast protein using low-grade petroleum paraffin wax residues as the sole source of carbon. Inorganic salts are used as sources of nitrogen and minerals. The firm is confident that this process can compete economically with other sources of protein for animal feeding and hopes to refine the product into a form suitable for human food as well.

There are other possibilities which have been suggested for utilising industrial technology for protein production, but none has so far received more than cursory technical examination or development.

In view of the critical lag in food production in developing countries, it seems urgent that more intensive technical attention should be given to the development of new ways for producing protein. The necessary sense of urgency required to initiate and support such efforts is not yet adequate in the world's scientific and technological communities.

Concluded

PRAWN EXPORTS WILL BE HIT

The increase in the purchase tax on prawns, announced by the Kerala Finance Minister while presenting the budget, would affect the export of prawns adversely, according to the president of the Seafood Canners and Freezers Association of India, Mr. N. J. Chacko.

Mr. Harold Allen (right) of the U.S. Bureau of Commercial Fisheries, Washington, who led the symposium on fish protein concentrate in Bombay on June 24 is handing out FPC-biscuits to the participants. Left to right: Dr. Kalyan Bagchi, Nutrition Adviser to the Union Ministry of Health, New Delhi; Dr. Jerzy T. Kukucz, Project Manager, U.N. Development Programme, Fisheries Training Institute, Bombay; Dr. S. M. Pereira, Paediatrician of the Christian Medical College and Hospital, Vellore; and Dr. G. V. Kulkarni, Director of Fisheries, Maharashtra State, Bombay.

HIGH-GRADE PROTEIN FROM FISH

HIGH grade protein from fish, a food supplement which can play a key role in the global war on hunger and malnutrition, can be produced for as little as one rupee per pound, Mr. Harold Allen, chief of the Technology Branch of the U.S. Bureau of Commercial Fisheries, told a symposium in Bombay on June 24.

"The development of fish protein concentrate (FPC) from whole fish in powder form is an entirely new means of preserving fish—an outstanding event of recent years in the food industry," he said. (See article by Mr. Allen elsewhere in the issue).

The symposium on fish protein concentrate was organised by the U.S. Agency for International Development (US AID) Mission to India in conjunction with the visit of the U.S. research ship **Oceanographer.**" More than a score of experts in fisheries and nutrition from the Union Ministries of Health, Food and Agriculture, and Community Development as well as from Maharashtra State and private firms participated in the symposium.

Protein deficiency is a major cause of malnutrition in most developing countries, including India, Mr. Allen noted. Fish protein concentrate can become a major weapon in combating the protein deficiency since it can be used as an additive to enrich a variety of food products like bread, biscuits, cakes and milk preparations.

Scientists of the U.S. Bureau of Commercial Fisheries, he said, have developed the process for manufacturing the protein concentate, containing 80 per cent high grade protein, as an odourless and tasteless powder. And after extensive tests, it has been cleared as a "safe, nutritious and wholesome food supplement fit for human consumption" by the U.S. Food and Drug Adiministration.

Several of the Indian experts participating in the symposium were enthusiastic about the prospects of introducing FPC in India. Dr. A.N. Bose, Director of the Central Institute of Fisheries Technology, Ernakulam, said, "FPC has got a definite future in India. It is one of the products in which the Government of India is very much interested." FPC is already being produced in India on a laboratory scale, he said. "We have enormous untapped fishery

(Continued on next page)

FISH PROTEIN CONCENTRATE—A NEW CONCEPT

BY HAROLD B. ALLEN

Chief, Branch of Technology,
Bureau of Commercial Fisheries,
U.S. Department of the Interior, Washington.

FISH protein concentrate, or its older name, fish flour, has been on the lips of fishery technologists for the past decade or more. But only in the past few years has this name, FPC, and the concept which it describes, been discussed intensively by members of the fishing industry and by scientists.

As this new "FPC" concept has developed, many people have not realised how uniquely different the idea of preparing a protein powder from whole fish is from anything else which has been done in the food industry. The development of FPC is really the development of an entirely new means of preserving fish in a different form.

DIFFICULT PROBLEM

Fishermen and processors have been working on the preservaation problem for centuries. It has been an extremely difficult problem to solve because fish generally spoil more rapidly than other protein foods such as red meat.

Solutions to the problem have involved the development of drying, smoking, salting, pickling, cooling, freezing, and canning processes. All of these processes are designed to inhibit the breakdown of fish tissue, either by the action of bacteria or by natural enzymes. But in each case the fish is preserved in a form closely resembling that of the original raw material. Thus, preserved products usually take the form of either whole dressed fish, steaks, or fillets. This preoccupation with preserving fish in its original form has, no doubt, been partly responsible for much of our failure to take full advantage of our oceans' rich fishery resources.

It is necessary when using the more expensive preservation processes to seek the valuable species of fish such as shrimp and tuna. In doing this, we neglect the vastly abundant fishery resources which are represented by species such as hake, anchory, herring, sardine, and the many small schooling fish of all oceans of the world. These many species of small fish represent a tremendous potential for economic growth of the world's fishing industries, as well as an ideal and abundant source of rich protein food which can be used to supplement the many foods now in use which are of lesser nutritive value.

FISHERY RESOURCES

Biologists, although they are not in complete agreement, have estimated that the seas of the world could sustain an annual catch of between 400,000 and 500,000 million pounds of fish. At the present time, less than 20 per cent of this potential world-wide supply is being utilised. Only in areas where fishing has long been practised, such as on the Grand Banks of Newfoundland, is the fishery resource utilised more or less fully. Most coastal areas and inland waters of the world could support much greater fishing activity, particularly that directed toward the smaller species not now esteemed by consumers and sought after by large fishing fleets.

We know world population is increasing at a phenomenal rate. Significantly, the areas of the world with the most rapid rate of population growth are also the parts of the globe where land animals do not thrive or are not widely produced for human food. Namely, these are areas of Asia, tropical Africa, and South America. Obviously, fish can play an increasingly important role in feeding these people if more effi-

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(Continued from previous page)

resources, and we can go ahead with this programme." he added.

Dr. D. P. Sen of the Fish Technology Experiment Station, Mangalore, said as of now India is not harvesting enough fish for a large-scale FPC programme, but this can be done.

Dr. Kalyan Bagchi, Nutrition Adviser to the Union Ministry of Health, discussed the role which FPC can play in combating malnutrition, especially among pre-school and school-going children.

Others participating in the symposium included Dr. C. V. Kulkarni, Director of Fisheries, Maharashtra State; Col. B. L. Taneja, Director-General of the Indian Council of Medical Research, New Delhi; Mr. V. G. Marathe of the Fisheries Technical Laboratory, Maharashtra State, Bombay; and Mr. K. H. Alikunhi, Director of the Central Institute of Fisheries Education, Bombay.

cient means are found to harvest them from the sea, and if an inexpesive, will preserved protein such as FPC can be manufactured from the catch. Our action in developing a research programme for FPC was based on the following assumptions:

1. The world supply of protein in usable form is critically short.
2. Not all the vegetable protein is of optimum quality. Vegetable proteins, which are the world's principal protein source, are lacking in certain essential amino acids and therefore must be supplemented by animal proteins such as those found in fish to form an optimum healthful diet.
3. A vegetable protein of low nutritive quality, when supplemented with only a small quantity of animal protein, gives growth nearly equivalent to that obtained with animal protein alone.
4. In ordinary market form, animal proteins are now prohibitively expensive for all but a small fraction of the world's population.
5. What is needed, then, is an animal protein, available in enormous quantities and at a low cost.
6. Fish protein concentrate offers one practical solution.
7. Although many difficulties still remain to be overcome before the people of the world can benefit from fish protein concentrate, these problems are largely technological and social and can be solved by the application of science.

RESEARCH PROGRAMME

In 1963, the Bureau of Commercial Fisheries began an intensive research effort to develop satisfactory methods for the manufacture of a variety of fish protein concentrates which would be suitable for use as dietary supplements in the United States and throughout the world. Our work has been carried out at the technological laboratory in College Park, Maryland.

In beginning the attack on this research problem, we made a world survey of the many research efforts which had been undertaken to develop a satisfactory FPC product. We learned by visiting countries throughout the world that many had tried and failed, or met with only limited success, because of the vast number of problems involved. Detailed plans for a research programme were developed, building on the background of the vast amount of information collected during these visits.

Before many months had lapsed in 1963, we had begun studies on two of the three principal techniques by which FPC could be manufactured. The first of these is a chemical method, carried out through the use of a solvent extraction. The second is a biological fermentation of whole fish. The third method involves physical techniques for separating fish components. Our initial studies dealt with chemical and biological methods only.

The commmon objective of all three processes is to remove the water and oil from the whole fish so that the product remaining consists of a dry, white, bland powder containing most of the protein and minerals of the original raw fish.

Our first work was done on a laboratory bench scale using equipment consisting of glass and stainless steel. On the basis of results obtained in these first studies, a preliminary engineering design was developed for a larger model scale FPC production plant capable of manufacturing 100 pounds of FPC per day through either the chemical or the biological procedures. While research continued at the laboratory, construction began on the larger model scale unit. It was completed in the spring of 1965 and has been used for an intensive programme to make preliminary information on the manufacture of FPC through solvent extraction procedures available to the fishing industry.

WHOLESOMENESS AND WHOLE FISH

Early in the course of the development of our FPC research programme, it became evident that in order to make the product available to those who need it most, the price must be low. Since one of the major costs in producing FPC is the price of the raw materials, only fish which can be easily harvested in large

numbers and then delivered to the FPC plant without further processing, are economically suitable. This means that whole fish must be used as the raw material for FPC manufacture, without resorting to heading or filleting or other expensive procedures. In view of the economic requirement that we use whole fish, exhaustive studies were begun at the College Park

Laboratory to determine the nutritive value and the wholesomeness of FPC made from whole fish.

The research was aimed at developing a single prototype commercial FPC process which would make available a product for chemical, nutritional, toxicological, sensory, and sociological testing. This process was developed, and FPC was produced from Atlantic red hake through the use of an isopropyl alcohol extraction procedure. Using this product, wholesomeness tests were carried out both in our laboratory and in the laboratories of several cooperating universities and private firms. The results of these many tests and experiments were compiled and the data presented to the Food and Drug Administration (FDA). In the spring of 1967, FDA completed their review of the data and approval for the sale and consumption of whole fish FPC was granted under the terms of the food additive laws of the United States.

PILOT PLANT

The approval of FPC for human consumption has focussed attention on the need to convert preliminary process information into a complete and finished design for an FPC pilot demonstration plant. Only through the construction of such a plant can all the necessary design details be worked out to enable private industry to construct full-scale commercial FPC plants at the earliest possible date.

President Johnson signed an act in the autumn of 1966 which is designed to accelerate the commercialization of FPC through the authorization of two pilot demonstration plants. The act authorizes $ 1,000,000 for the design and construction of one plant and not to exceed $ 1,555,000 annually for five years beginning in 1968 for operations and maintenance, for the leasing of a second plant from private industry, and for research and development associated with both plants.

We are hopeful that funds authorized by the Act will be made available on July 1, 1967, so that the pilot plant construction in the United States can begin in the autumn and the plant can be completed in the summer of 1968. The pilot plants will handle 50 tons of fish a day for 250 days a year. It will take six lb. of whole fish for one pound of FPC.

Engineering data developed in the pilot plants will be made available to the public both in the United

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BREAD IS NOT MADE WITH WHEAT ALONE

By R. N. VERMA

Chief Bakery Instructor, Institute of Catering Technology and Applied Nutrition, Bombay

BREAD can be one of the main answers to the food problem. It is economical, easy to store and easy to transport. Bread helps to cut down the enormous waste of food that one sees all around. A well-baked loaf can be kept for 96 hours. All that is required is a little change in the people's food habits, for if everyone starts eating one meal of bread every day in the big cities, the present ration can go a long way.

Contrary to popular notions, many foodstuffs can be incorporated in wheaten bread to make it tastier and more palatable. This is of importance just now because of the cut in the flour quota. When cereal and non-cereal additives are incorporated in bread, it becomes more nourishing and gives added variety to the consumer as well.

This writer has carried out many experiments with cereal and non-cereal foods, the results of which he would be happy to share with anyone interested. Given below is a list of cereal and non-cereal foods with suggested percentages :

1.	Peanut flour	7½%	10%	15%	20%
2.	Maize „	10%	15%	20%	
3.	Milo „	10%	15%	20%	30%
4.	Bajra „	10%	15%	20%	
5.	Barley „	10%	15%	20%	25%
6.	Ragi „	10%	15%	20%	
7.	Kuttu „	10%	15%		
8.	Rajgira „	10%	15%	20%	
9.	Wari „	10%	15%		
10.	Sago „	7½%	10%		
11.	Potato „	10%	15%	20%	
12.	Sweet Potato	10%	15%	20%	

RECIPE :

Flour + % of any foodstuff		100 Kg.
Salt	..	2 Kg.
Sugar	..	2 Kg.
Fat	..	2 Kg.
Dry yeast or	..	700 gms — 1 Kg.
Fresh yeast or	..	1 Kg. — 1½ Kg.
Hops	..	30 gms — 50 gms.
Acetic acid	..	50 gms — 100 gms.

METHOD :

1. Sift flour and % of foodstuff (in case of potato and sweet potato they should be added in sieved flour)
2. Add salt, sugar and fat.
3. Add yeast and water and knead the dough to a smooth consistency (in dough mixer for 15-18 minutes; and by hand 25 minutes).
4. Keep dough covered for about 1½ hours.
5. Knead again and keep for about 50 minutes.
6. Divide and scale and make into balls.
7. Mould and pan.
8. Prove for about 1 hour and spray water before baking.
9. Bake at 200°C—210°C for about 30-35 minutes.

QUEST FOR NEW FOODS

MILLIONS of people live in areas of the world where milk, meat, eggs, and other foods rich in protein—the food component which builds body tissue—are scarce. Lack of protein is serious. Experts in nutrition know that in children under six it can be especially so, because a really grave lack of protein can do permanent damage to physical, and even mental, health.

Yet foods like bananas, which are low in cost and readily available in many parts of the world, provide only the bulk which calms the pangs of hunger. They do not contain enough protein for growing children.

Is there a solution? Yes, thanks to the advances of modern science. Laboratories and test tubes are increasingly pointing the way to new food sources which hold hope for the future.

Two leading American nutritionists, Mr. George K. Parman and Dr. Nevin S. Scrimshaw, who recently surveyed the Indian food scene, noted that protein-supplemented "artifact" (or man-made) foods already are in use in several parts of the world—such as Incaparina in Latin America, Pronutro in South Africa, and Saridele in Indonesia.

They recommended that the production of similar types of formulated food, developed in India under the name Bal-Ahar, be undertaken in this country, utilising peanut flour, cottonseed oil, pulses, and other indigenous protein-rich materials as the protein source.

Bal-Ahar includes 65 per cent. wheat, maize, or any seed flour and—besides high-protein groundnut flour or other protein ingredients—vitamins and minerals.

WORK OF CFTRI

Processing Bal-Ahar is one of the diverse activities of the Central Food Technological Research Institute (CFTRI), Mysore. This trail-blazing institution has just received a fresh grant of Rs. 46 lakhs from the U.S. to continue for four more years its study of protein malnutrition and the benefits to children of protein supplements. In its research, CFTRI has had the co-operation of the U.S. National Institutes of Health.

Primary aims of the research project include: evaluating the protein content of indigenous vegetable foods such as oilseed meal, legumes and cereals; studying the protein content of fish as a diet supplement for infants and school children; investigating protein malnutrition and its effect on the human body; and determining practical protein food-supplements to effectively prevent childhood diseases.

"Unlike many developing countries, India has a wealth of internationally recognized technologists and scientists" in the field of food and nutrition, said the Scrimshaw-Parman report. "A great deal of imaginative and productive research of high quality, directly applicable to its food and nutrition problems, is in progress in India. The Central Food Technological Research Institute of Mysore has one of the broadest and most vigorous programmes of development of indigenous food resources anywhere in the world. This institute includes commercial practicability as a basic consideration in its food development programme.

"Other laboratories of the Council of Scientific and Industrial Research such as the Regional Research Laboratory, Hyderabad, have done equally useful work in food processing. The Nutrition Research Laboratories in Hyderabad are outstanding for their research on the nutrition problems of India."

The quest for new foods spans the world. Scientists from the U.S. Department of Agriculture, in their search for new sources of protein, are working on various ways to utilise enriched-flour mixtures prepared from cereals and other foods found in lands where protein consumption is low. The research is financed by the U.S. Agency for International Development. The United Nations Children's Fund (UNICEF) also is selecting scientists and engineers from developing countries to contribute to the world-wide research on nutrition.

SOYBEAN BEVERAGE

These scientists have already come up with a number of products, some experimental and others now being tested in pilot projects. One is a soybean beverage in a formula which combines soyflour, non-fat dry milk, vegetable stabiliser, corn dextrose, and vitamins and minerals. Locally grown fruits or juices can be added. It will be widely tested soon in India, as well as in Brazil, Taiwan, Hong Kong, Korea, and the Philippines.

Then there are a peanut-flour wafer ideal for children; a vegetable stew thickened with oilseed flour for added protein; and a soft, porridge-like food made from special flours, to replace the starchy food of low nutritional value now fed to babies in some protein-short areas.

Less exotic but of more immediate importance are "fortifiers" for foods already in wide use. Dry milk shipped under the U.S. Food for Peace (Public Law 480) programme is boosted by vitamins A and D. P.L. 480 flour and cornmeal going overseas is enriched with calcium (an essential bone and tooth builder), iron, and B vitamins.

The U.S. Agriculture Department's programme for artifact foods is headed by Dr. Aaron Altschul, chief research chemist of the department's Seed Protein Pioneering Research Laboratory in New Orleans. As a food scientist, he also knows that high-protein foods such as soybeans can be processed to look and taste

(Continued on next page)

EDITOR'S LECTURES ON NUTRITION

MISS Asha Amin, Vice-Principal of the Bombay College of Pharmacy and Editor of The Food Industries Journal, was among the guests of the Birla Institute of Technology and Science, Pilani, in May. She was invited to deliver a series of lectures to teachers of pharmacy from all over India gathered at a summer school sponsored and financed by the University Grants Commission and organised by the Department of Pharmacy of the institute.

Miss Amin gave four lectures on the biochemical implications of nutrition, starvation, physiological significance of enzymes and the role of enzymes in clinical medicine.

She said nutrition is a very important factor for health and should therefore be a matter of prime concern. Better health is a pre-requisite of a sound mind and increased efficiency. She listed a wide range of foodstuffs and explained the composition and function of each variety. Then the consequences of surplus or insufficient intake of each type of food were discussed.

BALANCED DIET

She outlined the qualitative and quantitative requirements of a balanced diet and the reason why these constituents were so vitally important. With the help of tables and equations she explained the importance of a protein-rich diet and retention and wastage of nitrogen.

She explained the psychic and physical factors responsible for ideal growth which can be induced with a plan which yields the best results for the life cycle as a whole.

In her second lecture, Miss Amin brought out the differences between balanced nuitrition and its extreme form—starvation. She described step by step the biochemical changes that occur during starvation —both over short and long duration—i.e., combustion of the carbohydrates followed by mobilisation of fat reserves and finally the breakdown of tissue proteins.

She explained the changes in tissues and fluids from initial to extreme conditions of fasting followed by the metabolic pathways which bring about excretion of the abnormal contituents.

The lectures on nutrition and fasting aroused considerable interest and a lively discussion followed. She answered the numerous questions raised during the discussion.

ENZYME CHEMISTRY

"Enzymes and enzyme chemistry have received unprecedented attention of the investigators during the last two decades and many difficult metabolic path ways have now been understood, yet our knowledge in the field has to be lot richer before we can understand the exact mechanism of many biochemical reactions", said Miss Amin in her opening remarks on the subject of enzymes.

She then traced the history and development of enzymes and explained, giving examples, the role of enzymes in biochemistry and microbiology. She illustrated with the help of several examples the mechanisms of enzyme action and the biochemical transformations resulting from enzyme action.

In the concluding lecture on 'Enzymes in clinical medicine' she confined the field of enzymes to those enzymes only which are of significance in clinical medicine.

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like many of what are now considered staple foods in the developing countries.

Dr. Altschul makes it clear that quality of protein is more important than quality in improving the world's diet. He points out that the adding of now commercially available amino acids such as lysine and methionine would upgrade present grain. It has been estimated, he says, that at a cost of about $ 1 (or Rs. 7.50) per lb. for lysine, it would cost only that amount a year per person to upgrade the protein value of wheat in India.

India has a considerable way to go before she is, in all areas and sectors, a well-fed nation. But she is making notable progress—and her modern-minded, forward-looking food scientists are among the foremost in helping step up the pace.

FPC PILOT PLANTS

(Continued from page 10)

States and abroad to facilitate the design and construction of large-scale commercial FPC plants. It is presently estimated that a processing plant with a capacity of 100 tons of raw fish per day can produce about 16 tons of FPC for about 7 or 8 cents per pound. Assuming a cost of raw fish of from 1 to 2 cents per pound, the final FPC would cost between 13 and 19 cents per pound. Adding six cents a pound for packaging and distribution costs and for profit, an FPC product might cost about 25 cents per pound at the consumer level. This represents a cost of 31 cents per pound on a 100% protein basis since FPC is 80% protein, which is much less than the cost of 87 cents per pound for the protein of dry milk powder, also on a 100% protein basis (dry milk contains 40% protein).

FPC produced in pilot plants in the United States will be made available to scientists working with U.S. A.I.D. and other groups to carry out feasibility and marketing studies on the introduction of this unique new high protein food into the diet of people throughout the world.

When we consider the protein deficiency in the diet of nearly two-thirds of the world's people, resulting in stunted health, vigour and mental capacity, as well as the future food needs of an expanding world population, it is obvious that FPC can become a major weapon in the global war on hunger.

FOOD THROUGH RECENT DECADES

By S. SRINIVASAN
Public Relations Manager,
Hindustan Lever Limited

IN most countries of the world food is no longer something one consumes to satisfy one's hunger. Over the years revolutionary changes have come about in our ideas about food and the part it plays in maintaining and improving human health and happiness.

The revolution in food began when man started putting by from the current plenty something for the rainy day by prolonging the life of whatever he ate. In pre-historic times he preserved meat with wood-smoke. Later, he learned to do it by salting. As far back as 2300 B.C. he used brine to preserve fish. Food additives like salt and spices had come into vogue by the time our grandmothers began making their wonderfully tasting preserves and pickles. For preparing their vegetable preserves, papads and crispies they depended on sun-drying.

ENTER CANNING

Canning or packing food into containers from which air has been extracted, thereby preventing or retarding deterioration, was another milestone in the march of food preservation. The process was invented early last century and canned fruits, fish, vegetables and meat have become familiar articles of diet during the last 50 or 60 years. The canning industry developed rapidly in countries where food production greatly exceeded consumption.

The Second World War gave a powerful stimulus to a more efficient form of preservation, namely, dehydration. Removing moisture from food is not only an effective means of preservation; it reduces weight and volume. Transporting dehydrated food is thus easy on space in ships, trains, trucks and planes. It is most suited for provisioning the fighting forces.

Quick-freezing and accelerated freeze drying are among the more advanced methods of preservation. In the case of quick freezing the lack of refrigeration facilities at retail shops and homes may prove to be an inhibitory factor. Accelerated freeze drying, however, has considerable possibilities, since this method substantially reduces the weight of the fresh product and does not require refrigeration facilities. Properly packaged, it can withstand variations in temperatures. Like dehydration, the product on reconstitution regains most of the appearance, taste and flavour of the fresh product. Besides, accelerated freeze drying enables the drying of large chunks which is not possible in dehydration where the product has to be cut into small pieces before drying.

The search for still more improved methods of preserving food continues all the time. Preserving food by irradiation holds great possibilities; the process, however, is still very much in an experimental stage.

The desire to conserve the excess over current consumption has been only one of the factors that have triggered the food revolution. Increasing sophistication in tastes, foreign travel, higher living standards and higher cultural levels have led to the demand for foods which are more varied, exotic tasting and incorporating sophisticated flavours.

Sociological changes like the desire on the part of the housewives to spend less time in the kitchen, the increased value she places on leisure, the habit of eating out, women taking up full-time jobs, the weakening of family ties, the increasing difficulty and expense involved in obtaining domestic help and the small-sized residential flats in cities have created a demand for pre-packaged, pre-cooked food which is easy to handle and store, which could be cooked quickly and with less effort and which also ensures top quality, variety, taste, flavour, etc.

FOOD ADDITIVES

With the introduction of such new foods, a whole range of food additives has come into use which makes food more nutritious, colourful, appetising and rich in flavour; they inhibit staling, moulding and prevent or retard deterioration. Some of them speed up the manufacture of foods while others improve their texture. There are components that add no flavour of their own to foods; rather, they heighten or modify the flavour of specific food ingredients already present. Because of their mounting cost, non-uniform compositions, instability, limited supply and fluctuating availability many natural flavours are being replaced by synthetic ones or substitutes.

City life with its fast tempo and accent on mental rather than physical effort has brought to surface the need for striking a balance between the claims of the palate and health in the matter of food habits. This has in turn facilitated the introduction of low-calorie foods. The latter, while pleasing the palate, limits the calorific intake, thus preventing over-weight and its consequences. Once the valuable role of food in maintaining health was recognised, it was only a question of time before special foods were evolved for infants, growing children and invalids.

Today the variety of foods offered to the consumer in the more advanced countries is indeed staggering.

A typical supermarket in the United States, for example, carries on its shelves some 8,000 different food items. The food industry in that country introduces some 5,000 new or modified products a year (only a fraction of which, of course, are successful). Quick-frozen food was sold in no more than 100 shops in the U.K. in 1946; today they are sold in 115,000 shops. Consumer expenditure on these items in that country has risen from £ 150,000 to £ 75,000,000 per year in the last 20 years.

All these changes have not come about just by themselves. The catalytic agent in the process has been the food manufacturer. His contribution to the food revolution has been a fine sense of anticipation about what the consumer is likely to want next and when, application of capital, science and technology to food processing, food raising and marketing skills which are indispensable in gaining consumer acceptance to new foods.

In this he has not had an easy row to hoe. In the first place, he has to wrestle with the governmental bodies for permission to use additives which he is convinced are harmless. Because it is easier and safer to reject an additive rather than approve one which might later turn out to be harmful, the authorities are invariably reluctant to approve of the use of new additives. Secondly, he has also to reckon with a certain section of public opinion which automatically assumes that natural foods are inherently good, but chemicals in foods are contaminants, adulterants or poisons. They fail to realise, of course, that all food components are, in fact, chemicals.

RAPID GROWTH

During the last three or four decades, the food industry in India too has been exposed to these powerful winds of change. Its velocity may not be the same as in some of the developed countries, but the direction certainly is. I am old enough to remember the days when we in India had no idea whatsoever of such things as breakfast cereals, canned fruits, fish or vegetables, jams, marmalades, chocolates, fancy pastry, etc. Today these are familiar articles of every day consumption. Except aerated waters, soft drinks were unknown until recently. Cellophane packets of wafers and popcorn which today cram the shelves of canteens attached to our cinema theatres were not there, say, five years ago. Instant tea and instant coffee are among the latest items offered to the Indian consumer.

The food industry's role in promoting national welfare is a lot more crucial in a country like India than is the case in the advanced countries in the West. While avoidance of wastage of food through preservation is economical in Europe or the U.S., it makes all the difference between normalcy and famine in India.

Between one-half and two-thirds of the people in India do not get food of the right type, nutritionally speaking, and one-quarter to one-third do not get even enough quantity to eat to sustain a healthy and active life. If this is the state of affairs during years when we have a normal monsoon, one can imagine what it would be like if the monsoon fails, as it did during last year and the year before.

Given this appalling food gap between what we need and what is avialable, the regional imbalances in the matter of food production and consumption, the distances over which food has to be transported and the tropical climate which drastically reduces the life of fresh vegetables and fruits, food preservation in India becomes a task of national importance.

RAW MATERIALS SUPPLY

Again, besides employing their money and all the resources of chemistry, biochemistry and bacteriology in preserving food, units in the food industry in our country have to devote as much attention to the stupendous problems of organising the raw material flow which boils down to making agriculture remunerative. This is done by placing at the disposal of the farmer finance, the necessary know-how derived from a variety of disciplines such as agronomy, botany, entomology, live-stock management and, above all, management skills. Processing agricultural products and helping the farmer to get the best out of his land and livestock are, therefore, two inseparable aspects of an integrated operation.

There is then the special responsibility which falls on the food manufacturer in India. He owes it to himself and to the country to do everything he can to increase the deplorably low level of protein intake of the people. India consumes less than 2,000 calories per person per day with 77 per cent of it derived from cereals, starchy roots and sugar as compared with 3,050 calories consumed in the advanced countries, the share of cereals, starchy roots and sugar being only 57 per cent.

The comparison becomes more disquieting, if one goes into levels of nutrient supplies by the sources. India consumes 51g. of total protein with only 6g. derived from animal sources whereas the total protein supplies available per caput per day in the case of more prosperous countries is 90g. with 44g. derived from animal sources. In the matter of protective food comprising animal products, fruits, vegetables fats and oils, India's consumption is not even a fifth of what it is in the West.

The food manufacturer in India has to face all the problems his counterpart in the West is exposed to, plus a few more like the widespread prejudice against food items or additives of animal origin. Paradoxically enough, milk and milk products enjoy the highest preference among strict vegetarians who constitute a substantial percentage of the consuming public.

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Even among the non-vegetarians there are those who avoid beef and pork.

Besides, it takes time and a lot of effort to change food and dietary habits. The consumer's decision to buy or not to buy a new food product does not depend solely on rational arguments supported by scientific research. There is in it an unpredictable element which is often the despair of the food processor. Even in the West, for example, tomatoes—'Love apples' as they were called at one time—were long regarded as dangerous aphrodisiacs and have gained general acceptance only during the last 50 years. One can, therefore, imagine how much more difficult it is to introduce innovations in matters of food in India where society is still very much tradition-bound, where literacy is relatively low and where socio-religious considerations tend to influence the choice of the people's diet.

The comparatively low purchasing power of the average consumer in India further limits the food processor's choice of new foods to items that could be sold at popular prices. The picture may change in the coming years, but the low income levels of consumers have to be taken into account in the short as well as in the not-so-short run.

All these limitations notwithstanding, there is no doubt about the immense scope for the development of the food industry in India. The rate of its growth will, of course, be determined by the ingenuity and initiative of the food manufacturer, the progress of research and technology, the helpful attitude on the part of the authorities and above all the improvement of our agriculture.

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LETTERS TO THE EDITOR

Readers are invited to express their views on any aspect of the food industries in this country in letters to the Editor. We shall endeavour to publish the letters in an effort to promote discussion and constructive thinking on the subjects dealt with.

Letters to the Editor should be brief and to the point.

Readers are also welcome to place before us any problems in their particular sectors of the industry and the Editor will try to find solutions to them with the help of experts.

Personalia

Mr. V. M. Srikumaran Nayar, Chairman of the Marine Products Export Promotion Council, Ernakulam, has been elected Vice-President of the International Shrimp Council at its world membership meeting held in Mexico City in the second week of June.

The International Shrimp Council (ISC) is an organisation formed in the U.S. with the object of promoting the consumption of shrimp and shrimp products throughout the world by advertising and propaganda. The Marine Products Export Promotion Council joined the ISC as a member on behalf of Indian exporters of shrimp to the U.S. early in 1966. In November, 1966, Mr. Srikumaran Nayar attended the meeting of the Board of Directors of the ISC held in New Orleans and has been continuing as one of its Directors.

Mr. R. A. Taraporewalla of Hindustan Lever Ltd., has been appointed head of the Industrial Products Division of the company. He will report to the Marketing Director.

Mr. W. Williamson of Tractors India Ltd. (Calcutta) has been elected Chairman and Mr. M. B. Bhaskare of Greaves Cotton and Co. Ltd. (Bombay) Vice-Chairman of Tractor Earth-moving and Construction Equipment Distributors' Association for the year 1967-68.

Dr. J. S. Cama has been appointed Director of the Esso Refinery. He is the first Indian to hold the post.

Sir James Lindsay, Chairman of Metal Box Company of India, has been elected President of the All-India Management Association for the current year.

Mr. S. B. Jhaveri has been elected President of the Solvent Extractors' Association, Bombay, for the current year.

Mr. V. D. Jhunjhunwala and Mr. D. C. Kothari have been elected President and Vice-President respectively of the Indian Sugar Mills' Association.

Mr. Chandrakant T. Sanghavi has been elected President, Mr. Jamnadas T. Taleja Vice-President and Mr. Manubhai Tribhovandas, Honorary Secretary of the Bombay Sugar Merchants' Association Ltd.

Healthy pineapples being sorted out and cut into big pieces before being mechanically processed or canned.

TRIPURA PINEAPPLE PRODUCTS FIND READY MARKET

By S. L. GHOSAL

Agricultural Information Officer, Tripura

THE pineapple deserves the distinction of being one of the major food plants of the world having been selected, developed and domesticated by men since ancient civilization. Today, large-scale crop production and industrial canning have made this tropical fruit available to millions of people living in non-tropical regions.

In India pineapple is grown on about ten thousand acres. Tripura, with plenty of rainfall and a light acid soil, ideal agro-climatic conditions, is a major pineapple growing area. The quality of Tripura pineapple is of a very high order. The fruit, healthy and wholesome, has a very sweet flesh of golden yellow colour. The fruit is at the same time nutritious due to its appetising and digestive qualities.

Kew and Queen are the two varieties grown in Tripura. Kew is good flavoured, somewhat bigger in size and has sweet flesh with a light yellow colour. Queen, the sweetest of all varieties, has juicy flesh with a golden yellow colour.

In Tripura, pineapples are planted during the monsoon, from April to September. The characteristic

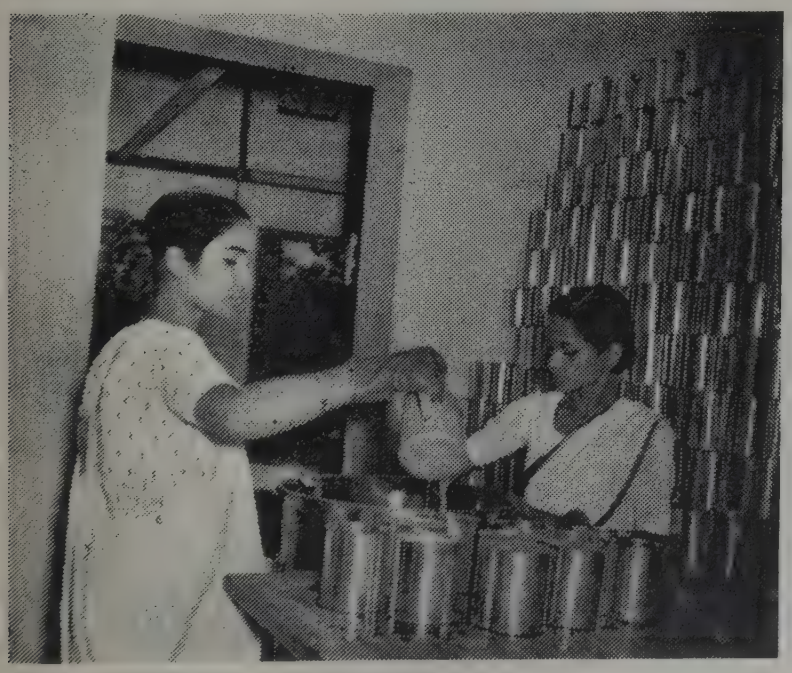
topographic feature of the place, undulating hillocks interspersed with narrow and medium valleys, requires contour plantation with a spacing of 4-6 ft. between rows. Areas with 20 to 30 per cent slope are usually recommended for pineapple plantation. About 1,500 suckers are required for planting an acre. The crop is highly responsive to manuring.

The manuring schedule, as recommended by the State Department of Agriculture, includes 45 kgs. nitrogen, 25 kgs. phosphate and 25 kgs. potash per acre. Pineapple requires good shade which is provided by way of interplanting bananas, cashewnut, citrus etc. The mature fruits are sometimes covered with leaves to avoid sun scorching.

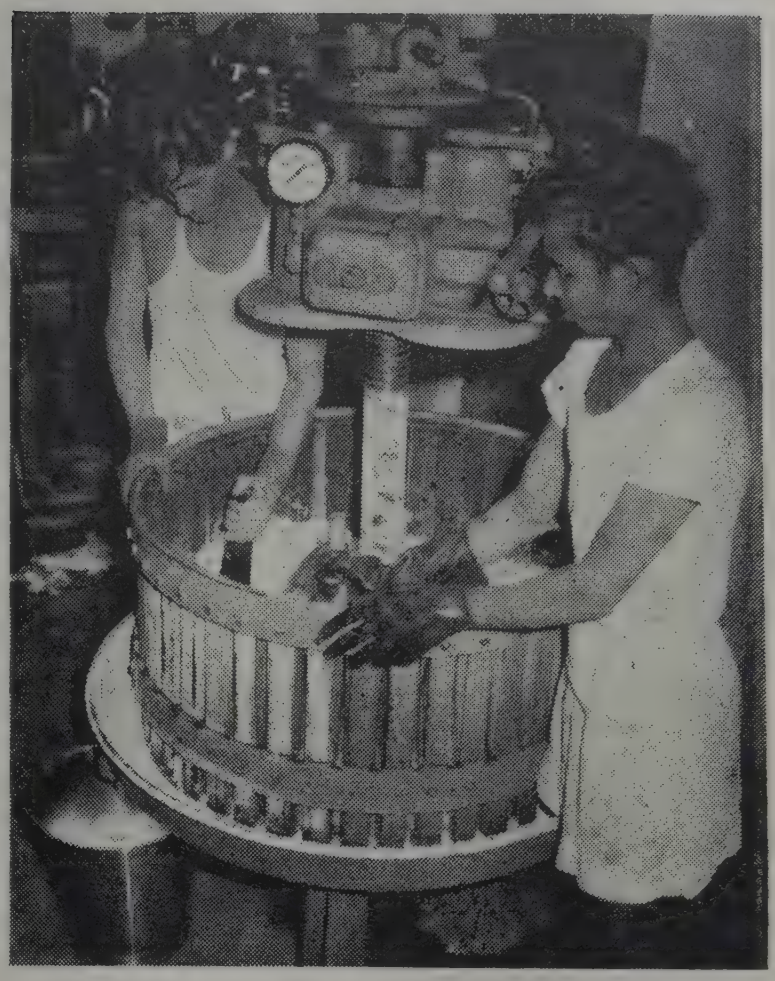
Formerly, during the peak season, there used to be a glut of pineapples. The prices would fall and hurt the pineapple growers. It is no more so. The Government of Tripura has set up two canning factories at Agartala with a capacity of 2,50,000 cans a year. Of late, treatment of pineapple plants with napthalene acetic acid, a growth hormone, has given encouraging results in the form of off-season fruiting under local conditions.

Tripura pineapples lend themselves readily to processing and they can very well be converted into various products to bring better returns to the growers. They are cut into pieces or into titbits. Pineapple jam is another product. And then there is pineapple juice. A refreshing drink for the thirsty, pineapple juice is produced in hundreds of gallons, tinned and sold in markets outside the State.

To be more specific, Kew, with a somewhat fibrous flesh and whitish juice, is mainly considered suitable for slices while Queen, with its rich flavour and colour, has been adjudged the best for the preparation of jam and juice. The pineapple products of Tripura find a ready market even abroad.



A woman worker fills in the cans with pineapple juice.



Machine used in the extraction of pineapple juice.

Tripura has an ambitious programme of expanding pineapple cultivation. It can very well do so for there is always a ready market for Tripura pineapples.

Export of Fruit Juices

The export of fruit juices, particularly mango juice, during 1967-68 is likely to touch the one-crore mark, according to the Processed Foods Export Promotion Council. Of this, exports to Russia will account for about 50 per cent while the balance is accounted for by Kuwait, Saudi Arabia, the U.K. etc.

The export during last year of canned and bottled fruits and vegetables and juices was of the order of Rs. 70 lakhs.

Pineapple juice is another item for which the market is being developed in Russia.

The U.S.S.R. and East Asia, specially Kuwait, are the two major areas offering fruitful market possibilities for our fruit juices.

Trends & Topics

PACKAGED FOODS & FARM ECONOMY

THE role of packaged foods in stimulating the Indian farm economy has been very succinctly brought out by Sir James Lindsay, Chairman of Metal Box Co. of India Ltd., in his statement circulated along with the report and accounts of the company for the year ended March 31, 1967.

With gold, the farmer's traditional incentive, no longer available, farm yields will improve only if the farmer's material standards of living rise and the peasant has a clear vision of a better life to strive after. This is how Sir James has prefaced his observations on the role of processed foods.

Sir James goes on to point out that the effect of the Sears Roebuck mail order system on American agricultural output has a clear lesson for India. After making the point that packaged goods manufactured from indigenous raw material could make an important contribution to the farmer's better living, he says: "The processed food industry has an important role to play in a countryside where every year, to quote but one of the statistics issued by the Food and Agriculture Ministry, nearly one million tonnes of fruit go waste. The recognition that has been accorded to the industry by the Government's categorising the manufacture of open top (sanitary) cans, a priority industry for imports, is, therefore, both appropriate and heartening. The announcement was too late for it to have any significant effect last year; but there are indications that, if the priority continues, a faster rate of growth will result which could make a real impact in the event of the Government's realistic measures to improve agricultural and horticultural output being as successful as they deserve to be. But a further policy decision by the Government is necessary: package fabricating capacity must be allowed to develop rapidly if there are to be enough packages.

"In any case a wide variety of packaged goods, such as baby foods, vanaspati, other edible oils, paints and petroleum products, are planeed for rapid growth. The requirement of tin containers for them will grow commensurately over the next few years. This demand is well timed to develop as the substantial Government investment in a five-stand mill and a large electro-tinning line at Rourkela will begin to become productive at the end of 1967. From then onwards tinplate/blackplate should become freely available for the first time in 30 years."

There is little doubt that there is both sound common sense and sound economics in what Sir James has to say on the significance of processed foods to Indian agriculture. The farmer's living standards can and will improve if more processed foods are made available. Besides, the setting up of facilities for making such foods will help to use Indian agricultural raw materials more fully. This, however, implies that the container industry is also allowed to expand along with the manufacture of processed foods. Any divergence between the rates of growth of the process and packaging industries—the contained and the container industries—will damage both industries as also the Indian economy. It must be hoped that the Government will be increasingly alive to the importance of running both these horses abreast in the interests of Indian agriculture and industry alike.

Solvent Extraction

THE need for preventing the use of edible oils for non-edible purposes like soap making continues to be as urgent as ever. But such diversion can be prevented only if sources of non-edible oils are fully exploited. Mr. S. S. Swaika, President of the East India Oil Millers' Association, has, therefore, done well to stress the need for developing rice bran oil as also better extraction methods. In particular, he has favoured solvent extraction.

Addresing the annual meeting of the association in Calcutta, Mr. Swaika pointed out how the oil mill industry has suffered through want of essential raw materials. He suggested that if sunflower were imported, this country could have more edible oils and also earn foreign exchange through exporting oilcakes left after extracting oil from sunflower. Mr. Swaika's suggestion, of course, implies that more and better facilities for extraction of oil are set up in this country. He is himself aware of this need, for he has favoured the setting up of an inquiry committee for assessing the capital requirements of the oil industry, the solvent extraction industry and the vanaspati units.

It is encouraging to note that the Union Deputy Minister of Commerce, Mr. Mohammed Shafi Qureshi, agrees with nearly all the points raised by Mr.

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FOOD PROCESSING IN BRITAIN : REVOLUTIONARY CHANGES

By ANTHONY H. WOOLLEN, B.Sc.

CHANGES that have occurred in British food production and consumption in the last 20 years amount almost to a revolution. Partly this is the result of intensive research triggered off by World War II. In part also it is the result of the intensively competitive nature of the industry, which comprises some 1,700(a) food manufacturing companies of significant size, ranging from the giant Unilever group to small businesses employing 100 people. The pattern of population in Britain has compelled the development of food transport systems and storage methods to a high degree, and has led to new methods of keeping food fresh for long periods.

But the greatest single influence is the fact that half the nation's food is imported. To the consumer this means an enormous variety in the food he eats; to the manufacturer it means an equal variety of raw materials which taxes his technical ingenuity to the limit. As a result the industry is becoming among the most technically advanced of its kind in the world.

Britons spend every year £5,500,000,000(b) on food, about 25 per cent. of their income. About half this amount goes on food which has been processed in some way. Yet in spite of the large imports, Britain's exports of manufactured foods are not inconsiderable. In 1965 they were worth about £ 116,000,000

LONG-KEEPING MILK

Food research, which is aimed primarily at developing new ways of preserving food and extending its keeping quality, is having a direct effect on exports. The dairy industry, for example, is beginning to exploit a new ultra-high-temperature method of pasteurising milk. This process involves heating at 150 degrees C for a few seconds followed by rapid cooling, and, in association with a technique for aseptically filling the milk into cartons which are then sealed, milk processed in this way has an indefinite storage life without refrigeration, even in the tropics. A British dairy company (1) is now producing commercially this "Long Life" milk at its dairy in Morden, South London. The company believes that in a few years' time £ 70,000,000 worth of the milk could be shipped overseas every year.

For centuries cheese has been a staple item of the Briton's diet. In the last two years a machine, now commercially available (2), has been developed, which automates the traditional process of making cheese curd and achieves in hours what formerly used to take days. The machine processes 7,000 litres of milk an hour and can be adapted to produce hard cheeses such as Cheddar or soft cheeses favoured in many other countries.

BETTER SWEETS

Overseas sales of British chocolate and sugar confectionery amounted to about £ 19,000,000 in 1965 (c). It is not surprising that the country has a highly developed confectionery industry, for Britons on an average consume nearly half-a-pound (230 g) per head every week (d). Automatic continuous sugar boiling machines have been developed which enable crystal-clear boiled sweets to be made and packed, in 17 minutes from start to finish. (3). What formerly required 30 workers can now be achieved by three,

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Swaika. Only he wonders whether the countries growing sunflower will be willing to export it. In any case, he has advised the association to work out all the details of their various suggestions and submit them to the Government. He has now clearly placed the ball in the association's court. It is up to this body to make a detailed study of the implications of its suggestions and confront the Government with a cast-iron case for larger and better facilites.

Flour Milling

The flour milling industry is in bad shape. The reasons are not far to seek. So long as the industry is denied access to more raw materials it must struggle hard to keep itself alive. As things are, it is estimated that the idle capacity in several flour mills in India is of the order of 60 to 70 per cnet. It needs no economist to say that, if any industrial unit uses only a small fraction of its installed capacity, it cannot possibly expect to work economically.

Realising that given the shortage of wheat there is little the flour milling industry can do to end its raw material shortage, Mr. M. P. Jatia, Chairman of the Calcutta Flour Mills Association, has come out with a novel, though sensible, suggestion. Addressing the annual meeting of the association in Calcutta, Mr. Jatia asked why the Government should not allow its ration shops to distribute wheat products, instead of wheat. Surely, if this were done, the industry could have more raw material to work with and the consumer would get a wholesome product milled under hygeinic conditions at cheaper rates. There is no reason why the Government should not accept this suggestion and work it at least as an experimental measure in some centres.

with a 50 per cent reduction in the floor space occupied by machinery.

Three of the new machines are installed in the developer's own sweet factory. The sugar mass passing through each machine is continuously and accurately dosed with flavour, colour and acid, and the boiled sugar mass is pumped to a depositing machine which produces the individual sweets. These then go to the wrapping machines.

The same company has also developed a method which considerably accelerates the production of chocolate-coated sweets. The new process replaces the traditional method of enrobing with a falling curtain of melted chocolate as the sweets pass along a moving belt. It involves spraying the sweets with atomised melted chocolate as they are tumbled in a rotating pan. Hardening of the coating is by a blast of cooled air from pipes at the other side of the pan.

In 1964 there were 300 confectionery manufacturers in Britain compared with 600 in 1958; total production was about the same but labour employed fell by about 15 per cent. (e). This illustrates a trend which is universal throughout the country's food industry: the merging of separate companies into larger groups and the reduction in labour requirements through increasing automation.

HIGH-SPEED DOUGH MIXING

The centuries-old way of making bread by mixing dough with yeast and allowing it to rise before being baked is rapidly giving way to a process devised in a British research establishment (4) in which the dough is subjected to intense mechanical working in a high-speed mixer. The process time is reduced by 60 per cent and floor space required for machinery by 75 per cent, while the product is claimed to be better. Nearly half the bread consumed in Britain is now made in this way. It is estimated that eventually the proportion will be 80 to 90 per cent (f). Mechanical working for a few minutes achieves the same effect as several hours of yeast fermentation.

The process has now been extended to biscuit and cake manufacture; a British company (5), which produced the world's first commercial high-speed mixing machine for bread in 1962, has developed equipment which can be used for either bread or cake by changing the mixer impeller plate. Another company (6) has produced a machine for turning out puff pastry in 20 seconds, compared with 20 minutes by conventional means. Many bakeries now use these new machines.

NEW JAM-MAKING TECHNIQUES

The jam and preserves industry in Britain has also been undergoing fundamental changes as a result of the introduction of new manufacturing techniques. Rapid switch-over from batch production to continuous production has taken place as the result of the introduction of new types of plant (7). Traditional strawberry, blackcurrant, apple, gooseberry, cherry and other fruit jams, and, of course, marmalade made from Seville oranges, are now produced in even better quality by the new continuous techniques, and by improved batch methods which employ a process of boiling in vacuum kettles instead of in open kettles as formerly.

CONVENIENCE FOODS

The field in which the greatest advances have been made in Britain in recent years is that of what is sometimes called "convenience foods". These are dried and quick-frozen vegetables; quick-frozen vegetables, meat and fish; and complete prepared meals. The fastest growing sector is the frozen foods industry, whose products are currently being consumed at approximately 5 pounds (2.27 kg) per head per year (g) averaged over the entire population.

Dried foods today bear no relation to their counterparts of 20 or so years ago; drying is now carried out under such strict control that only water is removed from the food. On reconstitution, the product has the same flavour, texture and appearance as the original food.

Research into the structure of food cells has enabled methods to be devised of removing the water without damaging the delicate cells. One of the most important advances in this field was the discovery of freeze-drying by scientists working at the Ministry of Agriculture, Fisheries and Food Laboratory at Aberdeen, Scotland.

In this method the food is frozen and the ice then sublimated in vacuum by the application of gentle heat, leaving the food in a dry, porous state, of the same volume as originally but lacking its water content. The porous nature of the resultant substance permits rapid and complete reconstitution. Foods of this nature are now being commercially produced in Britain and Ireland (8), both for retail sale, as such, and for incorporation into other manufactured foods-soups, prepared meals and so on (9). "Instant" tea and coffee (10) and other such foods are also being prepared by freeze-drying.

AUTOMATED ICE-CREAM PRODUCTION

Products such as ice-cream and soft drinks, while not staples of diet, achieve large sales in Britain. The largest and most highly automated ice-cream factory in the world (11), in south-western England, is closely rivalled by the modern plant near London of another company (12). One authority (e) estimates that Britons spend £ 34,000,000 a year on ice-cream, and even more—£ 99,000,000—on soft drinks, which they consume at the rate of nearly 500,000,000 imperial gallons (2,273,000 kilolitres) (d) a year in terms of ready-to-drink product.

The margarine industry, with an annual output worth £ 7,000,000 (h), has progressed steadily since the discovery of vitamins enabled the product to have a nutritive value equivalent to that of butter. The ma-

nufacture of table margarines and of vegetable fats and shortenings for manufacturing use is closely integrated, and this industry is another that is highly automated, the largest and most modern plant in the United Kingdom being at Bromborough, Cheshire (13).

This brief survey cannot be closed without mention of such flourishing industries as infant and dietary foods, sales of which exceed £ 8,000,000 a year (e); pickles and sauces (£23,000,000) (e)—one of Britain's rapidly growing food categories; breakfast cereals (£ 41,000,000) (e); and processed fish products (£ 17,000,000) (e).

In contrast to the consumption of fresh fish, which is declining, that of fish products is increasing. Work at the Torry Research Station at Aberdeen, Scotland, has led to this situation. The station is actively promoting the development of new products, such as fish sausages and "crisps", made not only from popular fish but from lesser-known species too.

Whatever, the state of nations and of individual economies, man must be fed, a bioligical fact which, underlined by hard economic conditions, provides the stimulus to research leading to better processes and food products.

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(2) A.P.V. Company Ltd., Manor Royal, Crawley, Sussex, England.

(3) Barker and Dobson Ltd., Whitefield Road, Everton, Liverpool 6, Lancashire, England.

(4) British Baking Industries Research Association, Chorleywood, near Rickmansworth, Hertfordshire, England.

(5) George Tweedy and Company Ltd., Saunderake Works, Chipping, Preston, Lancashire, England.

(6) G. and R. Gilbert Ltd., Restmore Way, Hackbridge Road, Hackbridge, Wallington, Surrey, England.

(7) William Brierley, Collier and Hartley Ltd., Bridgefield Street, Rochdale, Lancashire, England.

(8) Erin Foods, Carlow, Ireland.
Batchelors Foods Ltd., Limestone Cottage Lane, Wadsley Bridge, Sheffield 6, Yorkshire, England.

(9) Batchelors Foods Ltd., (see (8)).
Maggi Soups Ltd., Aylesbury, Buckinghamshire, England.
Knorr Soups, Paisley, Renfrewshire, Scotland.

(10) Nestle Company Ltd., St. George's House Croydon, Surrey, England.
Brooke Bond and Company Ltd., 35 Cannon Street, London E.C. 4.

(11) T. Wall and Sons (Ice Cream) Ltd., Wall's House, Gloucester, England.

(12) Lyons Maid Ltd., Glacier House, Hammersmith Grove, London W. 6.

(13) Unilever Ltd., Unilever House, Blackfriars, London E. C. 4.

Plant For Irradiated Meat

THE first commercial-scale plant for preserving meat by atomic sterilisation will be built in Allentown, Pennsylvania, by Irradiated Foods, Inc., in co-operation with the U.S. Atomic Energy Commission (AEC). Its capacity will be at least one million pounds of meat a year.

The announcement, made by the AEC, holds enormous promise for revolutionising meat processing and marketing in the United States and abroad. Irradiated meat holds its flavour and wholesomeness for months and even years without refrigeration.

"Several varieties of meat will be processed at the plant and introduced into the civilian market as soon as federal Food and Drug Administration (FDA) approvals are obtained," the AEC said. Radiation-processed bacon has already been cleared by the FDA and is being eaten by armed forces personnel.

BACTERIA DESTROYED

Small doses of radiation preserve meat by destroying bacteria which cause spoilage. The radiation, as in an ordinary chest X-ray, passes through the meat. None remains behind to make it radio-active.

The new plant will use Cobalt-60 as the radiation source. Meats will be irradiated as they move past the cobalt beam on conveyor belts.

Agriculture specialists estimate that the world's food supply might readily be increased by one-third by atomic radiation.

NEW PRODUCTS AND PROCESSES

ESSO MULTICIDE is the latest weapon added to the horticulturist's armoury in the war against plant pests and diseases. Combining three powerful chemicals — captan, malathion and sulphur — this brand-new product provides broad-spectrum control of insects, mites and fungi infesting flowers, vegetables and fruits. Whether it is a problem of fighting plant pests such as aphids, flea hoppers, leaf perforators, leaf worms and red spiders or of controlling fungi like anthracose, damping-off, downy mildew, powdery mildew, early or late blight and black spots, Esso Multicide is effective. Not only does Esso Multicide serve as a death-dealer to plant pests and diseases, but it also boosts growth and puts new vitality into fruits, flowers and vegetables, it is claimed. Harmless to plants even in an accidental overdose, the product is said to be non-poisonous to human beings and animals. Esso Multicide is available in 250 g. pack.

MUSTH : Yet another firm has come out with instant soft drink tablets. Packed in bottles of 10 and 40, "Musth" tablets are available in two flavours—orange and pineapple. The manufacturers (Nila Products Ltd., 98, Dadar Main Road, Dadar, Bombay) promise "on-the-spot cool drinks for only 15 paise a glass."

GRAPE CHUTNEY is the new product put on the market by Yeshwant Co-operative Canning Co., of Pimpalgaon-Baswant, Nasik District, Maharashtra.

JEFFS are Parle's new savoury biscuits. "Exotic in flavour—thin as a wafer" goes the ad. line. Commended as "a new pastime pleasure" and "a new ace among biscuits", it is claimed "a tin of Jeffs is your winning hand, when it goes with a deck of cards."

ANIMAL PROTEIN FROM PUPAE

The Central Food Technological Research Institute, Mysore, has developed a method to process silkworm pupae as a source of protein in livestock and poultry feed.

A large quantity of silkworm pupae is available in Assam, Jammu and Kashmir, Mysore, Orissa, the Punjab and West Bengal, and hitherto this was used only as a manure or was wasted. Although it was known to scientists that it could be used as a source of protein, this was not commercially possible in the country as the removal of the hard outer covering of pupae posed a serious problem.

The process developed at CFTRI involves mainly the removal of outer coating of pupae by chemical treatment, followed by washing, processing and drying. The final product contains almost 55 per cent protein and 25 per cent fat.

The process is now being commercially used by two firms in Mysore State and the product sold to some feed manufacturing plants in India. Some Japanese firms are understood to have shown interest in importing the product into their country.

The development of this process has made possible the utilisation of a material which had been mostly wasted. It has also helped overcome, to some extent, the severe shortage of animal protein for livestock and poultry feed.

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GAS FROM CANNING WASTE

A plant to produce inflammable gas from decomposed canning waste has been set up by a private-sector factory in Trichur. The gas will replace firewood hitherto used for heating boilers.

The factory is manufacturing vinegar from pineapple waste juice under the direction of the Central Food Technological Research Institute, Mysore. It has also plans to produce cattle fodder out of pineapple waste.

The machinery installed in the factory is mostly designed and developed indigenously.

It has capacity to produce 35,000 cans of pineapple juice per day out of 30 tonnes of pineapple.

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Bharat Electronics Ltd., Bangalore, has developed a new light-weight ultrasonic depth sounding equipment for the detection of fish shoals. The device is fully transistorised.

ROLE OF SHIPPING IN IMPORT OF FOOD GRAINS

By A Shipping Correspondent

INDIA's increasing foreign trade makes it imperative that the Union Government should consider the acquisition of new ships. A large and efficiently used merchant marine not only helps the country's economy, but also greatly strengthens its defence efforts in a national emergency caused by alien aggression.

It is admitted that, in our country, the merchant marine is inadequate to meet its needs. This fact was brought out with telling effect by Jawaharlal Nehru when he inaugurated the National Shipping Board.

Said the late Prime Minister: "Whenever I have seen the amount of money we have spent on freight, more especially on the carriage of food grains in the past years, I have been not merely alarmed but horrified that these vast sums of money have gone just on freight. If a part of them had been utilised for building up our own shipping or acquiring them, obviously, even from the point of view of saving money, it would have been considerable and from other points of view even it would have been desirable."

RISING FOOD IMPORTS

The total valume of our overseas trade in recent years has been between 40 million and 43 million tons per year. Of this, a substantial proportion is accounted for by food grains imported into the country. From three to four million tons in previous years, the import of food grains has shot up to seven to eight million tons in the past two or three years. Except for limited quantities imported from Burma, Thailand and Australia, the bulk of the imports is from the United States.

The freight paid on imported food grains amounts to a very substantial proportion of the total freight payments in our overseas trade. Though no precise

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FOCUS ON RESEARCH

CONCENTRATED FERTILIZERS

ISRAELI technologists have successfully experimented with concentrated fertilizers to prove that they can be cheaper substitutes for conventional fertilizers.

The Dead Sea and the Negev desert provide Israel with its main mineral resources, potash and phosphates, now shipped to all parts of the world. But export of conventional fertilizers as raw material entails 'fillers' or 'ballast', usually calcium for phosphate and chloride for potassium, and adds to the bulk, which means higher transport costs. Apart from that, the fillers are needless and, in the case of chloride, even undesirable.

Prof. J. Hagin and Mrs. S. Scherzer, of the Fertilizer Development & Soil Fertility Laboratory of the Haifa Technion, Israel Institute of Technology, have experimented with potassium metaphosphate, a highly concentrated form of potassium and phosphate that is processed by Chemicals and Phosphates Limited in Israel.

A series of greenhouse tests was done, in which crops were grown in the widest possible range of different soils, foreign as well as local. It was shown that potassium metaphosphate is as efficient as any conventional fertilizer, and, in certain cases, superior. More than that, it could be used in smaller quantities and yet give just as good results. The size of the granules of the fertilizer, that is, its physical form, influences its effectiveness in different types of soil.

Samples sent abroad by Chemicals and Phosphates for trying out in the field have confirmed these findings in places as far apart as the Philippines, Britain and Holland.

NEW FERTILIZER

Bitterns available at major salt works in the country may soon be used for the manufacture of potassium-schoenite on a large scale.

The Central Salt and Marine Research Institute, Bhavnagar, has produced, through a process evolved by it, potassium schoenite on an experimental basis. In its pilot plant it produced 1.5 tons of this fertiliser a day. Manufactured on a commercial basis at ten tons per day, it would cost Rs. 85 per ton, said the director of the institute, Dr. D. S. Datar.

According to him, potassium schoenite is suitable for crops which do not tolerate chloride. Among such crops are tobacco, potato, sugarcane, citrus fruits, tea, coffee and rubber.

The country can save Rs. 1.5 crores per year by producing potassium schoenite. This fertiliser can be a substitute for potassium sulphate which is being imported at a very high cost, said Dr. Datar.

CEYLON TEA RESEARCH

A new technique to upgrade poorer quality tea has been developed by the Tea Research Institute in Ceylon and is being applied to leaf grown in the island's low country which compares badly with the produce from the hill areas.

Research on developing "instant tea" is also being carried out by the Institute in collaboration with the National Research Development Corporation in London.

DEHUSKING GINGILY SEED

The Oil Technological Research Institute at Anantapur in Andhra Pradesh has developed a mechanical method for the continuous dehusking of gingily seed.

The manual dehusking of black gingily seed in mills at present is not very hygienic.

Consumers prefer oil from dehusked gingily seed and the cake from the dehusked seed is of much use because it is rich in proteins. An edible flour can be prepared out of it.

Contributions Invited

Articles, preferably illustrated, on topics of interest to the food and allied industries are invited.

Whether it is a controversy to be debated, a problem to be discussed, a grievance to be voiced, an experience to be shared, an event to be recorded or an achievement to be highlighted, The Food Industries Journal provides the best medium of communication.

Contributions should be typed and normally not exceed 1,000 *words.*

FOOD NEWS

FACTORY TO PRODUCE POULTRY FEED

A factory for producing food for poultry will be set up at Chiplun near the Koyna hydro-electric project in Maharashtra, the State Minister for Agriculture, Mr. P. K. Sawant, has said.

Mr. Sawant, who was inaugurating a poultry centre run by the Ratnagiri Taluka Poultry Development Co-operative Society, said such centres would help wipe out the food deficit in the State.

The State Government had spent Rs. 1.5 crores on the development of poultry farming during the Third Five-Year Plan. The Government not only gave financial assistance to poultry farmers who needed help, but also had plans of holding short-term poultry farming courses for villagers.

COTTAGE CASHEW INDUSTRY

The cashew industry is facing a new problem. It is created by what is known as the cottage industry. The allegation against the cottage cashew industry is that factory owners are diverting a sizable portion of their production to it because the labour cost is 50 per cent of what they have to bear in their own units.

The Cashew Export Promotion Council, which considered this problem, appointed a seven-man committee under its chairman, Mr. M. P. Alexander, to study the working of the cashew cottage industry.

There is an apprehension that if factory owners send cashew for processing in the cottage industrial units, there would be unhealthy competition which would harm the cashew industry.

CASHEW KERNELS EXPORT

A steep rise in the export of cashew kernels and cashewnut shell liquid has been registered in the first four months of 1967 compared with the corresponding period last year. The value of the exports from January to April, 1967, was Rs. 15.70 crores against Rs. 9.45 crores in the first four months of last year.

Cashew kernels accounted for 15,900 tons valued at Rs. 15.16 crores and shell liquid 3,400 tons valued at Rs. 53.5 lakhs in the January-April period this year.

BREEDING OF EDIBLE FROGS

Edible frogs are to be bred by the Assam Government which has been told by the Central Fishery Research Committee that natural conditions in the State are conducive to frog culture.

The Government has allocated Rs. 30,000 for the scheme.

The frogs will be exported to Western countries where their legs are a delicacy.

In Kerala, the Fisheries Department of the Government is to open a frog breeding farm in Pannivelichira in Alleppey District this monsoon.

According to the Director of Fisheries, Mr. George, two varieties of edible frogs will be bred in the farm — Rana Trigrina and Rana Hexadactyla.

Mr. George said that out of Rs. 6 crores worth marine products exported from Kerala in 1965-66, frog legs accounted for 378,237 kilograms valued at Rs. 25 lakhs.

PRODUCTION OF FISH SEEDS

Fish seeds under induced breeding are being produced on a commercial scale in Assam, the Director of Fisheries, Mr. S. N. Bhuyan, said at a recent seminar on fisheries in Gauhati.

Assam, he said, was the only State to start such a venture. The fish seeds were being distributed not only in the State but outside too.

FISH BY RAIL

Kerala will start exporting ten tonnes of fish a week by rail to West Bengal in two consignments by the end of July under a government-to-government arrangement.

The terms of supply have already been generally agreed upon between the two governments.

The Fisheries Corporation will handle the export mainly from the Malabar region.

Both the Governments of West Bengal and Kerala have approached the railways to extend the refrigerated wagon facility from Vijayawada to Madras. Such a facility is already available on the Calicut-Madras and Vijayawada-Calcutta lines.

A proposal to airlift fish to West Bengal from Kerala has been dropped owing to the huge cost involved.

FISHING SURVEY

The Kerala Government proposes to conduct a deep-sea fishing survey on the Kerala coast from Kayamkulam in Quilon District to Oottayi near Tirur in Calicut District with Swedish assistance.

Mr. M. P. M. Ahmed Kurikkal, Fisheries Minister, said a team of Swedish experts would visit the State soon. It would also suggest whether any new landing facilities would be necessary.

The survey was expected to be completed within three or four months.

The expenses in connection with the survey would be met equally by the foreign collaborators and the State Government.

BUILDING FISHING VESSELS

The building of fishing vessels and their operation at Visakhapatnam, Tuticorin and Mangalore are part of a Rs. 11.60 crores project to be undertaken in the public sector.

The project is the result of the report submitted by the FAO-World Bank mission which visited India late last year.

Besides building fishing vessels, berthing accommodation, shore services, storage, processing and marketing facilities will be provided at the three ports.

The deep-sea fishing project is one of the seven development programmes in which the World Bank and the International Development Association have shown interest.

The projects are being processed for being provided assistance by these international organisatons.

IMPORT OF TEA BY ITALY

According to the tea trade, Italy imported from India tea worth 271,400,000 lire in 1966 against 206,900,000 lire in 1965. Imports from Ceylon dropped from 1,103 4 million lire to 1,037.3 million lire. From Britain the imports declined from 211,400,000 lire to 108,300,000 lire.

The rise in the import of tea from India has to be viewed against the background of a drop in the total import of tea by Italy from 2,081.1 million lire in 1965 to 1,954 6 million lire in 1966.

DAIRY FOR INDORE

A dairy plant with an initial capacity to handle 20,000 litres of milk daily will be commissioned in Indore by the end of September.

It will be a joint venture of the State and Central Governments.

A modern milk processing plant and machinery for the project costing Rs. 22 lakhs have been supplied by New Zealand under the Colombo Plan.

An extensive programme of fodder cultivation and milk collection from the adjoining districts is being undertaken and Rs. 1 lakh has already been advanced as loans to co-operative societies.

EDIBLE OILS OUTPUT

To meet the growing demand for edible oils, the Government of India has allowed a substantial ex pansion of the production of these oils by five factories in different parts of the country. The expansion will be to the extent of 50 tonnes per day.

Egg Preservation

"Here in Britain our rather cold and unpredictable climate at least relieves us of some of the problems of food preservation", reported John Newell in the BBC World Service programme "The Farming World".

"For example, we don't have to worry much about preserving eggs. But in India, five to ten cent. of all eggs are spoiled by microbial infections, and their quality falls off in the damp climate. So the Indian Central Food Technological Institute has invented a new way to preserve eggs, by dipping them into a petroleum-based oil which has got anti-bacterial and anti-fungal compounds added to it. And this keeps the eggs fresh for about a month, at a cost of less than twopence for 100 eggs."

COMPANY NOTES

BRITANNIA SALES SOAR: EXPORTS UP BY 50%

A final dividend of 14% on ordinary shares, subject to deduction of tax, making a total payout of 20% for the year ended March 31, has been declared by the Britannia Biscuit Co.Ltd.,

Despite adverse trading conditions, 1966-67 proved yet another success story in the history of the company. Sales shot up to Rs. 11,35,08,057 from Rs. 9,29,10,798 in 1966, registering a rise of 2.11 crores, while profits before tax increased by Rs. 4,15,361. The overall profit ratio after tax has been reduced from 5% to 4.5%.

In the first nine months of 1966 the company made good progress with sales and profits well up on the previous year. Towards the close of the year, however, the shortage of ingredients and high prices tended to squeeze profits.

The popularity of the company's products in the home as well as export markets has increased. Export sales improved by over 50% compared with the previous year's record. The company made a vigorous bid in the year to penetrate new overseas markets.

Shortages of essential ingredients and rising costs of flour, fats, milk products and packaging material hampered production. The price of flour, which was raised by the Government last year, was further increased. Vegetable oils rose by over 40% and milk products, besides being in short supply, reached price levels equal to nearly three times the landed cost of imported milk powder. The price of tinplate continued to spiral and containers generally cost about treble the price of similar products of foreign manufacture. The situation was further aggravated by devaluation.

The construction of the Madras factory was completed on schedule and trial production began in February,1968. But production in the new unit has been affected by shortage of flour and sugar. The company plans to develop new lines.

TOMCO issues right shares

The Directors of the Tata Oil Mills Co.Ltd. have decided to issue 2,24,240 equity shares of Rs.25 each at par and offer them to the existing holders of equity shares in the ratio of two new shares for every five shares held. They have also decided to issue 35,000 — 9.3 per cent. cumulative redeemable preference shares of Rs.100 each to the public for subscription by prospectus. The proceeds of the proposed issue will be utilised for meeting partly the capital expenditure and additional working capital for the next few years.

With its sales rocketing from 17.29 crores to 23.12 crores, the company's gross profit has risen from Rs. 91.25 lakhs to Rs.1.09 crores.

The company proposes to enlarge the capacity of the animal and poultry feed plants.

Metal Box profits up

It is encouraging to note that, despite several handicaps such as raw material shortage and recession in demand, the sales of the Metal Box Company of India have improved by Rs. 2.54 crores to Rs. 22.96 crores for the year ended March 31,1967.

Profits after tax have amounted to Rs.87.1 lakhs as compared with Rs.86.7 lakhs in the previous year. Among appropriations, the development rebate reserve has been increased by Rs.10.50 lakhs to Rs. 51.9 lakhs.

An interim dividend of 60 paise per share was paid in January,1967. The Directors have recommended a final dividend of 60 paise per share. The company's share capital has been increased by captalising reserves and by issuing right shares to Rs.6.91 crores against Rs. 3.52 crores a year earlier.

The company is making good progress in expanding its manufacturing facilities. The Bombay No.2 factory extension is reported to be on its way to completion; congestion will ease and productivity improve further in this plant. The Madras factory is in operation. The machinery for the Cochin factory will soon be installed. High-speed equipment will be shortly set up in the Faridabad factory; when completed, it will make many different containers automatically and achieve better quality.

The Chairman, Sir James Lindsay, says sales would have been considerably higher but for raw material shortages, recession in the demand for engineering industry-based products and insufficient fabrication capacity.

Kaira Can enters market

Kaira Can Co.Ltd. has entered the capital market with a public issue of Rs. 9.90 lakhs comprising 4,900

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TATA OIL MILLS TO TURN TO JAMS AND JUICES

The Tata Oil Mills Company proposes to enter the field of food industries by taking up the manufacture of squashes, jams and juices in the first instance and later canned products at its Ghaziabad factory, near Delhi.

Disclosing this in his annual statement to the shareholders of the company, its Chairman, Mr. J. R. D. Tata, also declared that the technical staff of the company was confident of being able to produce protein isolate of high quality on a commercial scale.

The company plans to step up considerably the production and sales of cattle and poultry feed by extending the existing plant.

Mr. Tata expressed himself in favour of intensive farming of oilseeds and utilisation of vegetable oils and other fats not so much for soap making as for edible purposes. It was basically unsound for the country to turn a great deal of its inadequate supplies of vegetable oils to the manufacture of soap, he said.

(Continued from previous page)

equity shares of Rs.100 each and 5,000 - 10% cumulative redeemable preference shares of Rs.100 each.

The company has negotiated for a suitable plot of land to set up a factory to manufacture cans. Meanwhile, the company has started manufacturing open-top sanitary cans in a temporary shed.

Sales up to March, 1967, totalled Rs.21.38 lakhs and in the current year they are expected to be about Rs.70 lakhs.

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Poysha Industrial Co.Ltd., Bombay, has been accorded permission to issue capital of Rs.35 lakhs in 9.5% cumulative redeemable preference shares of Rs.100 each for cash at par to be offered to the public.

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Lily Biscuit Co. Private Ltd., Calcutta, has been given consent to issue bonus shares of the value of Rs.4.50 lakhs by capitalising the capital reserve.

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Bombay Foods Private Ltd. has been permitted to capitalise the accumulated profit of the company to the extent of Rs.2,70,300 and issue further capital of Rs.2,09,100 in 2,703 bonus shares of Rs.100 each in the proportion of three bonus shares for each equity share held.

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DEMAND FOR FROG LEGS IN BELGIUM

UNTIL 1966 the import of frog legs was not permitted by Belgium. This law, however, was abolished in May 1966. Since this date there has been a number of enquiries from Belgian parties regarding the possibility of procuring supplies of frozen frog legs from India.

The representatives of two Belgian firms came to India to negotiate business and placed initial orders. Both firms foresee a large volume of business with India in the future if difficulties like lack of reefer space causing late deliveries and short supply of the product can be overcome. Payment by Belgian importers is made with a 100% letter of credit.

Offers of frozen frog legs should be made in the following manner:

(a) In blocks of 225 grams each containing 15-20 pairs, 20-25 pairs, or 25-30 pairs packed in polyethelene bags.

(b) The number of pairs per block should be stipulated when quoting.

(c) The quantity available with the exporter for immediate delivery should be stated.

(d) The quantity available on a regular monthly basis should be mentioned.

(e) The frog legs should be packed in such a fashion as to permit a visual counting of the number of pairs in each block.

Presently c.i.f. Antwerp prices acceptable to Belgain importers are in the region of US dollars 1.800 per kilogram.

Customs duties levied on this product in Belgium are : General 16.2%; EEC 4.2%.

A transmission tax of 7% is also levied. A list of likely importers of frozen frog legs in Belgium is given below. Indian parties interested in exporting their goods to that market may contact them directly with their offers and samples.

If supplies of frog legs with adequate and regular shipping facilities are made available India should be able to supply considerable quantities of frog legs to the Belgian market.

Belgian importes of frog legs : 1. Messrs. Hottelet & Co., 426, Mechelsesteenweg, Edegem/Antwerp. 2. Mr. G. Siefers, Director, O.N.G., Centre International Rogier, Place Rogier, Bureau No. 2306 A, Brussels I. 3. Messrs. Sogedi, 8, Quai des Usines, Brussels 2. 4. Messrs. J. Huybrechts, 30, Bd. de Dixsmude, Brussels. 5. Mr. Renaud Loymeye, 26, Avenue Emile Duray, Brussels 5. 6. Maison Vanderbist, 17, rue Brinchaut, Brussels.

ROLE OF SHIPPING IN IMPORT OF FOOD GRAINS

(Continued from Page 23)

statistics are available regarding the total freight payments, it has been estimated that these amount to ten per cent of the total value of our overseas trade. As the value of the latter has recently been ranging between Rs. 2,000 crores and Rs. 2,200 crores per year at the pre-devaluation rate of exchange, it may be assumed that the freight payments amount to Rs. 200 to 220 crores per year.

The total quantity of food grains imported in 1966 was in the region of eight million tons. Most of it was imported from the U.S. Assuming that the average freight rate was 80 shillings per ton, the total freight paid on eight million tons works out at Rs. 67.2 crores.

It will be seen that in terms of freight food grains account for about one-third of the total overseas trades.

MODERN TRENDS

The movement of food grains from the U.S. is mostly done by foreign tankers and bulk carriers, their size ranging between 20,000 and 50,000 dead weight tons. The modern trend in the transportation of bulk commodities is to employ large-sized vessels. The employment of such vessels, apart from assisting the large movement of bulk commodities, tends to bring down the cost of transport per ton of cargo.

Though India owns at present 18 bulk carriers, they are hardly being utilised for the movement of food grains. They are being used mostly in international cross trades.

The reasons are : (a) Most of the Indian ports at present do not have the capacity to handle bulk carriers. In case they are employed in the food grains trade the unloading operations will have to be carried out in midstream with the assistance of lighters and barges. This increases the cost of transportation which Indian shipowners can hardly afford to bear at present. Their bulk carriers are recently built ones, the capital cost of each vessel ranging between Rs. 2 crores and Rs. 2.5 crores (at the pre-devaluation rate of exchange).

(b) The prevailing tramp rates for food grains are uneconomic from the point of view of Indian shipowners. Though these rates fluctuate from time to time in accordance with the law of supply and demand, there has been generally a downward trend in the level of tramp rates in the two or three years. The owners of foreign vessels may be in a position to operate even at these rates because, for various reasons, the operational costs of such vessels, with the exception of U.S. flag vessels, are comparatively low. In the case of U.S. flag vessels, the owners are granted subsidy by the U.S. Government.

To enable Indian ships to participate in the food grains trade, it is essential that the capacity of Indian ports should be suitably developed and other handling facilities should also be improved. It is further necessary that Indian shipowners should be granted economic rates of freight. Under the present food grains agreement with the U.S., the Indian Government is not in a position to pay Indian shipowners any higher rates of freight than the prevailing tramp rates. If they do so, they become liable to pay the same rates of freight in respect of U.S. flag ships which have a minimum of 50 per cent share in the food grains trade.

One way of overcoming this difficulty is, perhaps, to employ the bulk carriers for the export of iron ore on their outward trips from India and to pay Indian shipowners a higher rate of freight for the ore that would compensate them for the lower rates on food grains. Here again there may be practical difficulties arising out of the fact that ore is mostly exported on an f.o.b. basis at present with the result that freight is paid by the foreign buyer. It may not be possible to persuade foreigners to use Indian ships and, at the same time, pay higher freight rates. This difficulty can be overcome only if the sale of ore is concluded on a c.i.f. basis, so that shipping arrangements are left in the hands of the Indian exporters (mostly the M.M.T.C.).

EXCHANGE DRAIN

In the present context of the acute foreign exchange difficulty, India can hardly afford to incur the huge foreign exchange expenditure involved in the payment of freight on imported food grains. If only a part of this expenditure could be diverted for the acquisition of ships, such ships will not only help to reduce such foreign exchange expenditure but will also, in the long run, contribute to the foreign exchange earnings of the country.

The Government of India ought to give some thought and attention to this aspect and make use of the present opportunity provided by the large-scale import of food grains for the development of national shipping.

Tea Machinery Exports

India exported tea machinery valued at Rs. 30,64,863 between April 1966 and February 1967 compared with Rs. 18,25,889 in the same period in 1965-66.

A significant performance was the export of tea machinery worth Rs. 2,72,171 in February 1967 to Iran. In February 1966, there had been no such export at all to Iran.

Among the countries which stepped up the import of tea machinery are Kenya, Malawi and Uganda.

MARKET IN JAPAN FOR CASHEWNUTS

Although cashew has been exported from India to Japan for years and in sizable quantities, it has not yet gained consumer demand as in the United States or the United Kingdom.

The following table gives an idea of our exports of cashew kernels to Japan during the last five years:

Years	Quantity in tonnes
1962-63	350
1963-64	390
1964-65	500
1965-66	510
1966-67	500

Cashew is mainly consumed by the confectionery manufacturers like Meiji, Morinaga and Fujiya, who use cashew in their preparations—chocolates, cakes, etc. which they manufacture. But the consumers are rarely aware of the presence of cashew in these preparations.

CONSUMER PREFERENCE

Consumer preference for cashew is as follows :

(a) 320 counts.
(b) L.W.P. (large white pieces).
(c) 450 counts (if 320 counts are not obtainable).
(d) Splits.

Pieces and splits are used by manufacturers of chocolate and confectionery. Whole kernels of 320 counts and 450 counts are sold in retail in packages of various sizes and to selected high class restaurants for use as snacks. Cashew sold retail costs about three times the landed cost.

This is because it has to bear the duty and the profit margin of the importer, distributor, wholesaler, subwholesaler and ratailer. The following are some of the brands of cashewnut available in the Japanese market and their prices :

Brands	Packets	Wholesale price	Retail price
Passion	380 grams	440 yen	550 yen
Passion	270 „	335 „	420 „
Passion	130 „	180 „	230 „
Choshuya	60 „	—	100 „
Ton brand	75 „	—	100 „
Olympic (tin)	100 „	—	150 „
Olympic	65 „	—	100 „

IMPORT DUTY

The import duty on cashew is 20 per cent ad valorem whether in bulk or in consumer packets. This levy is rather high, as it pushes up the cost of cashew to a level at which it does not gain preference over walnuts and other nuts. Attempts are being made to have the duty reduced if not abolished as cashew falls in the category of tropical products exported by a developing economy. The importers in Japan feel that a reduction in the tariff rates would definitely contribute to an increase in consumption.

Japan is a major importer of cashewnut shell liquid from India, the figures being as follows :

Years	Exports of cashewnut shell liquid
1962-63	1,130 tons
1963-64	1,450 „
1964-65	2,190 „
1965-66	1,200 „
1966-67	2,400 „

[From a report by the Indian Embassy in Tokyo]

ICI Fertilizer Project will be Asia's Largest

THE International Finance Corporation (IFC), Washington, is to invest Rs. 8.7 crores in a Rs. 62-crore fertilizer plant being established at Kanpur by one of ICI's Indian subsidiaries. An agreement to this effect was signed in London on June 26 between representatives of the I.F.C. and Indian Explosives Ltd. (IEL), the ICI subsidiary which has undertaken this project. This is the first occasion on which this World Bank affiliate has contributed to the growth of Indian fertilizer capacity.

The ICI plant, which will be Asia's largest when it starts production in October, 1969, will produce 450,000 tonnes of urea per year at full output, saving Rs. 30 crores annually in foreign exchange. The application of this quantity of urea can result in raising foodgrain production by two million tonnes per year.

The plant will be backed by the resources of the ICI, who are one of the largest manufacturers of fertilizers in the world. It will use the well-known naphtha-steam reforming process for ammonia production developed by the ICI; ammonia will be converted to urea by the well-tried Toyo Koatsu process of Japan. Naphtha, the basic raw material, is to be supplied by pipeline from the Indian Oil Company's refinery at Barauni, in north Bihar.

The finance for this project will be raised by the issue of fresh equity capital of Rs. 16.68 crores, by loans and suppliers' credit to the extent of Rs. 33.43 crores, by cash retention of Rs. 8.75 crores and by a bank overdraft of Rs. 3 crores: a total of Rs. 61.86 crores.

The entire foreign exchange component of Rs. 24.18 crores is being provided by the contribution to equity capital by the ICI and the IFC and the loan and suppliers' credit offered by the IFC and the Japanese supplier of the urea plant. A consortium of institutional investors and banks led by the Industrial Development Bank of India is providing a rupee loan of Rs. 19 crores. The approval of the shareholders and the Controller of Capital Issues has been secured; the formal agreement with the IDBI will be signed shortly.

SCOPE FOR BOOSTING EXPORT OF MARINE PRODUCTS

INDIA earned a record Rs. 17.37 crores worth of foreign exchange in 1966-67 by exporting nearly 21,120 tonnes of marine products. Cashing in on the insatiable world demand for prawns and shrimp, Indian exporters sold overseas buyers nearly 13,000 tonnes of frozen, canned and dried prawns and other prawn products worth more than Rs. 14.5 crores. Even allowing for the devaluation of the rupee, the achievement is sizable, compared to the 1955 figure of Rs. 6.92 crores for 15,460 tonnes of seafoods and other products.

The biggest customer was the United States, which accounted for most of the frozen and canned prawns, all the frozen lobster tails and the largest slice of frozen frog legs exported from this country.

With the popularity of and demand for all kinds of seafood showing no sign of diminishing, there is vast scope for Indian exporters to expand their activity, provided they are able to meet the exacting requirements of the importing countries in regard to quality, processing and packaging and are also able to hold their own against international competition.

The following figures based on statistics provided by the Seafood Canners' and Freezers' Association of India, Cochin, will be of interest:

(For the purpose of this review, only the five most important items, led by prawns (including shrimp), have been taken into account. Even in regard to prawns, prawn powder, prawn bits, prawn pickles, prawn meal and shrimp powder have not been included).

A cursory glance shows that prawns are our most important export commodity. India's biggest customer is the United States, which accounted for 8,867 tonnes of prawns (8,120 tonnes frozen, 720 tonnes canned and 27 tonnes dried) valued at Rs. 987.82 lakhs. America is also the main buyer of frozen lobster tails and frozen frog legs.

There is great scope for boosting exports; the total 1966-67 export figure of some 21,116 tonnes hardly represents two to three per cent of the annual landings of fish in India. For instance, the total landings for the calendar year 1965 was 8,32,777 tonnes (including 81,892 tonnes of shell fish).

An inhibiting factor, according to many exporters, is the high freight tariff for Indian frozen and canned seafood shipped to the United States. Representations continue to be made in this regard to the West Coast of India/Pakistan/USA Conference of shipping lines which fixes the cargo rates.

Item		Quantity exported (in tonnes)	Value (Rs. in Lakhs)	Principal customers
1.	Prawns (frozen)	9,838	1117.66	U.S., Japan, Australia.
	„ (canned)	1,959	270.23	U.S., U.K., France.
	„ (dried)	1,195	63.13	Hong Kong, Singapore, Ceylon, U.S., Mauritius.
	Total :	12,992	1451.02	
2.	Dried fish	6,672	152.80	Ceylon accounted for 6,569 tonnes worth Rs. 148.74 lakhs.
3.	Frozen frog legs	714	82.27	U.S., France, Belgium.
4.	Shark fins and fish maws	185	21.14	Singapore (125 tonnes worth Rs. 9.54 lakhs), U.K., Hong Kong.
5.	Frozen lobster tails	81	16.69	U.S., (total offtake)
	Grand total of marine products exports 1966-67 : 21,116 tonnes worth Rs. 1736.85 lakhs.			

PORTABLE WATER PURIFIER

A NEW portable water purifier, capable of producing up to 180 litres per hour of demineralised water, is announced by **The Permutit Company Limited,** Permutit House, Cunnersbury Avenue, London, W. 4. The unit known as the Mark 12, is available in two types (one of which removes silica and carbon dioxide from the water) for producing water which can be used in research, and industrial laboratories, and for process work in the chemical, textile, electrical, food brewing, and allied industries. The quality of the treated water is indicated on a built-in conductivity tester.

The unit consists of two ion exchange cylinders mounted on a tubular frame fitted with two wheels. The operating panel and the control unit are fitted above the cylinders. Since the ion exchange method is used, no power or heat is required and very little maintenance needed. Furthermore, the unit requires no plumbing but takes the water to be purified from any ordinary tap.

NEED TO MANUFACTURE PROTEIN FOODS ON COMMERCIAL SCALE

The following is the text of Mr. Jagjivan Ram's address to the International Symposium on Protein Foods and Concentrates in Mysore on June 27 :

It gives me great pleasure to be with you today for inaugurating this International Symposium on Protein Foods and Concentrates. I am happy to learn that distinguished scientists from several countries and representatives of international organisations have taken pains to attend the symposium.

In spite of the growing tension in the world, there are many fields where international cooperation can produce such results as will add to the happiness of mankind. In this direction scientists and technologists have a very important role to play. It can be noted with great satisfaction that scientists by and large have shown the way to international cooperation in making the achievements of science available for the benefit of mankind. The present symposium is a step further in that direction.

The world as a whole has been suffering from food shortage because the rate of growth of population is much faster than the rate of increase in food production. Measures for population control and for increasing food production have no doubt been taken, but these, by themselves, are not adequate. Only the quantitative limitations in food have not only to be overcome but the serious qualitative deficiency has also to be removed, without which normal functioning of the human body is greatly retarded. Children who need balanced protein diets are the worst sufferers.

CRUCIAL PERIOD

Nearly 20 per cent of the world population of 3.2 billion falls within the vulnerable groups. In India alone, 75 million children are below the age of four. This early growth period is crucial; it is during this period that 90 per cent of the human brain develops, and if the diet is deficient, brain development is affected and the damage done cannot be repaired at a later stage. Any investment in social welfare, such as education, recreation etc. cannot produce the desired results if the basic material is defective. A great stress, therefore, will have to be laid on the qualitative aspect of food, particularly with regard to the protein content of the diet.

The problems in other developing countries of South-East Asia, Africa and Latin America are similar. I am, therefore, very happy that top scientists of the world who have pioneered research and development in high protein foods have gathered here to discuss various aspects of protein foods and concentrates. I am particularly happy that representatives of industry, who should be interested in the manufacture of high protein foods developed by scientists and technologists are also participating in the symposium. With their active interest, it should be possible to utilise the know-how developed by food scientists and technologists, for commercial manufacture and marketing of food products so that they may become available to the consumers expeditiously.

GOVT. ASSISTANCE

It is also necessary for the Governments of the countries in this region to take an active part in providing all possible assistance for technological development, production and marketing of high protein foods. The Government of India will not spare any efforts in this direction. If available protein resources, particularly legumes and oilseeds, could be utilised, it should be possible not only to overcome the qualitative deficiencies in foods, but also to meet a sizable portion of the shortage in food. India is fortunate in having an annual production of 12 million tonnes of legumes and the production is increasing. This will help considerably in removing the deficiency of certain vital nutrients, such as lysine.

While the value of processed foods made from non-conventional raw materials, which have a very vital role to play, cannot be minimised, there is need to educate the people, particularly in rural areas, on the importance of utilising the raw materials available to them, and to improve their diets.

I note from the programme of the symposium that due attention is being given to fish proteins. Countries like India with long coast lines and a large number of rivers, rivulets, lakes, tanks and ponds have a great potential for utilising fish and fish products. Within our limited national resources, we are making efforts to increase the catch of fish both from sea and inland waters, but much more needs to be done.

VEGETABLE PROTEINS

With the attention that is being given to cattle and poultry, there will be a rise in the production of milk and eggs; but these are expensive items and can reach only the higher income groups. The development of balanced protein foods mainly based on vegetable proteins, therefore, assumes great importance for the large majority of the vulnerable segments of the population in all the developing countries of the world, whose income is very low.

Items like the Indian multi-purpose food, 'Bal-Ahar' and pre-cooked infant food developed by the Central Food Technological Research Institute have roused a fair amount of public interest and these products are available to a limited extent for use. Their production and use requires to be increased. Now it is for the industry to manufacture and market these pro-

ducts, so that children, and also other sections of the vulnerable population may benefit from them.

It is but appropriate that the Central Food Technological Research Institute in India, where a substantial amount of work has been done on high protein foods has been chosen as the venue for the symposium. I am grateful to the scientists from different parts of the world who have made noteworthy contributions to food science and technology for having come here to exchange experiences and pool together their knowledge and technical know-how in the production and marketing of protein foods. I am very happy that various international organisations are taking active interest in this symposium and that the National Institutes of Health have shared a considerable portion of the financial responsibility with the Council of Scientific and Industrial Research.

ECONOMIC PRICES

You have before you a comprehensive programme of technical sessions and discussions and I do not wish to take any more of your time. I have no doubt that useful results would accrue from your deliberations. There exists quite a big gap between what is known and what is being done. Much is known about high protein food formulations, but very few of these foods are being produced at economic prices to meet the needs of the common man. You have rightly laid stress on their production, consumer acceptance and marketing. By doing so, you are helping to bridge the gap. I do hope that your deliberations would encourage entrepreneurs to take up the manufacture and marketing of high protein foods.

With these few words, I inaugurate this symposium and wish you all success in your deliberations.

NARIELWALA'S ADDRESS

Mr. P. A. Narielwala said :

It gives me great pleasure, as chairman of the organising committee, to offer you a warm welcome to this International Symposium on Protein Foods and Concentrates with particular reference to processing, marketing and consumer acceptance. In a symposium of this nature where we have the privilage of having over 100 international and national scientists, a layman like myself has really no place and certainly not on this rostrum. But in a developing country like ours, it has been the practice to rope in all talents of such quality as is available in the country for the furtherance of any worthwhile project, and as such I happen to be here. The second reason for my being here is that for some years I have been directly and indirectly associated with the work that is being done at the Central Food Technological Research Institute in Mysore on protein isolates and in formulations under the able guidance and direction of Dr. Parpia and his devoted band of scientific workers. I can, therefore, claim a nodding acquaintance of the subject of protein foods.

It is a happy augury for the success of this meeting that we have with us the Chief Minister of Mysore, Shri Nijalingappa, to preside and the Minister for Food and Agriculture of the Government of India, Shri Jagjivan Ram, to inaugurate the symposium. Their presence here is not merely symbolic of the importance that the Governments at the State level and at the Centre attach to the role protein has to play in India and in all developing countries and the promise it offers for reducing nutritional deficiencies in the diet of their people; it is also an indication of Government's earnestness to promote the production and development of protien foods and concentrates and their distribution in India. We also appreciate greatly the encouraging response we have recieved from scientists, technologists and industrialists the world over to attend this symposium at our invitation, to deliberate from a common platform on some of the major problems of diet and nutritional deficiencies, to share their experiences and to find solutions for them in the service of mankind.

COMMERCIAL EXPLOITATION

The first meeting to discuss the commercial possibilities of developing high protein foods was organised in 1963 in Rome by FAO and UNICEF with the active participation of WHO. This was followed in 1964 by the International Symposium on Oilseed Proteins in Japan. At the Tokyo meeting, the idea of organising this symposium in India was conceived as several of the participants felt that there was a need to discuss steps for the commercial exploitation of the research work done in various laboratories of the world for the development of high protein foods and for their consumer acceptance. It was also the unanimous view at the Tokyo meeting that without the active co-operation of the governments of developing countries where protein malnutrition persists, it would be difficult to produce high protein foods at a cost cheap enough to promote their larger intake.

Ever since the start of civilisation, food intake has taken a set pattern and led to the establishment of certain national eating habits in the nations and communities of the world depending upon the availability of certain types of food. Good food is usually defined as one that meets the biological and cultural requirements of man. In India, because of the limited availability of both meat and fish and their consequential high prices, animal protein intake has been poor. Also, a fair section of the population being vegetarian, meat and fish consumption has not been as universal as in advanced countries. Due to similar socio-economic conditions in the other newly emerging countries, the consumption of animal products there is also of the same level as in India. In the higher strata of society, meat consumption has become a status symbol, but in the poorer sections of the community where the intake of protein has been low due to poor living standards, protein malnutrition has been accumulating over the decades and at a more rapid rate since the population explosion which India and many of the other developing countries are experiencing at

present. This has only aggravated the problem of protein malnutrition.

VICIOUS CIRCLE

Protein deficiency has been demonstrated as being one of the principal causes of physical deformities and of damage to brain tissue. And here we get into a vicious circle of having a large number of inefficient men and women in our population who are incapable of participating in the programme of social and economic advancement or of improving their own position in the social strata. Even though there have been creditable increases in the production of foodgrains, milk, fish, fruits, dairy and other protein products, these increases have not kept pace with the needs of a growing population. The problem of protein deficiency has thus assumed serious proportions and it can no longer be ignored or neglected, save at our peril.

It is from this point of view that the scientific and technological advances that have taken place in the last decade or so in the research laboratories of the world are to be welcomed as providing opportunities for reducing the protein imbalance in the diet of the poor and neglected sections of society. The techniques for producing edible quality protein from oilseeds, superior varieties of fish flour and now from leaves are ready and available for exploitation. So also are formulations for producing concentrated protein foods which have been worked out by food scientists and technologists. It is for industry the world over to come forward, with its resources, to pioneer the production of these high protein foods in a spirit of dedication. If I may say so, industry is best qualified to consider ways and means of harnessing the available technology to manufacture protein foods in forms acceptable to and within easy reach of the various social and economic strata of society.

CONSUMER ACCEPTANCE

In preparing the programme of the symposium, the organising committee has laid adequate emphasis on technology, resources, production, consumer acceptance and marketing. At the Central Food Technological Research Institute, Mysore, sufficient know-how and knowledge have been gathered for producing a variety of protein-rich foods like the multipurpose food, **Bal Ahar,** vegetable toned milk and pre-cooked dehydrated weaning and infant foods. They have received consumer acceptance with the test trials that have been undertaken and a certain amount of commercial interest in these products has been created. These are the areas which should be of immediate interest to industry which has a vital role to play in this large field of producing special foods which are needed for combating malnutrition in the vast areas of Asia, Africa and Latin America. This symposium would have served its purpose if, as a result of its deliberations, protein foods begin to be made available on a large scale and at cheap prices.

The protein isolates that can be produced from various oilseeds flours or directly from oilseeds themselves are recovered in a powder form and have a bland taste; they can be consumed as such or easily incorporated into our traditional foods in order to fortify them and thus avoid conflicts with cultural and social practices which dominate our food patterns. There are also the new meat simulates, a series of foods based on vegetable protein with meat-like flavour and texture. These products are the result of the great technological advance that has taken place in protein technology. It should be possible to produce these meat simulates at a cheaper cost than the price at which natural animal protein can be had. Unfortunately many of the vegetable proteins lack in one or two essential amino acids, especially lysine and methionine. These amino acids are already being manufactured on a commercial scale and at economical prices by chemical synthesis and fermentation processes. Their production on a wider scale would enable the wider use of vegetable proteins and correction of amino acid deficiencies.

PROTEIN FROM LEAVES

In recent years attention is also being given to the recovery of protein from green leaves; some leaf proteins are reported to be biologically as good as soya protein with lysine content anywhere between 5 to 7 per cent and they hold out a good future not only for their use in animal feeds but also in some human foods. There are algae, like **Chlorella,** containing 60 per cent protein which biologically may not be superior but are still a good potential source of protein. There have also been developments in the manufacture of high protein concentrates from petroleum. These have not yet reached a stage of exploitation for edible use, but when they do, they might well become an inexpensive source of protein.

An answer to our protein deficiency could also be found by the wider cultivation of cereals with high protein and essential amino acids. The cultivation of hybrid maize with a higher lysine content is now in the realm of realisation and if this variety of maize could be introduced on a large scale in farms all over the world, the problem of protein malnutrition can be more successfully and more easily tackled without disturbing the set traditional food habits.

The organising committee of the symposium in India has received much encouragement and financial support from the Office of International Research, National Institutes of Health of U.S.A. and the Council of Scientific and Industrial Research, India. To these organisations this committee is highly indebted.
The international agencies have always felt the responsibility of finding a solution to the problems of protein malnutrition. They have encouraged the development of high protein foods and much valuable information and expertise has accumulated during the last decade as a result of their efforts. We are confident that as a result of the deliberations at this symposium, ways and means will be found for producing

CALL FOR EMERGENCY PROGRAMME

After discussing 50 papers in ten plenary sessions, the International Symposium on Protein Foods and Concentrates has called for an emergency programme to solve the problems of protein malnutrition in the developing countries.

The papers dealt with the production, consumer acceptance and marketing of protein foods and concentrates. The symposium emphasised the international character and urgency of the protein malnutrition problem, according Dr. H. Parpia, Director of CFTRI, and Dr. N. Shaw of the United States.

While there was a strong feeling at the symposium that no food programme could succeed without a vigorous family planning programme, there was no formal recommendation for such a programme.

Along with the effective use of conventional protein sources, all available unconventional protein sources should also be exploited, it was emphasised. It was felt that, in regard to India, oilseeds like groundnut and cottonseed could be used as sources of protein food.

A call to Governments was given by the symposium to make available raw material at control rates to industry engaged in manufacturing protein foods, and provide tax relief on the sale of protein foods also.

protein foods of high standard and excellence on a commercial scale and made available at an economic cost to all those who need a better balanced protein diet.

The secretariat of the organising committee was set up in the Central Food Technological Research Institute of Mysore and was assigned the task of making arrangements for this symposium. The committee has spared no efforts, but it is conscious of its limitations. If there have been any lapses in looking to the convenience of the delegates, I would express the apologies of the committee and of myself. I can assure the delegates that these lapses could only be the result of our unconsciously overlooking the needs of the delegates.

HIGH PRIORITY URGED

Before I conclude, I would like to leave behind a thought that India and other countries where protein malnutrition prevails, should give protein production the same high priority in the stream of advancement as is being done to communications, atomic power, electronics, medicine, etc.

Dr. C. A. Egger of UNICEF said in his message :

It gives me great pleasure to convey warm greetings and best wishes on behalf of UNICEF, and on my behalf, to all of you assembled here for the International Symposium on Protein Foods and Concentrates. As I have to attend the UNICEF executive board meetings in New York this month, I regret my inability to be present at this important smyposium.

The convening of this symposium is most opportune, particularly in view of the increasing interest to explore and exploit all available sources of protein as a means to fight malnutrition among vulnerable groups of population. Malnutrition in India has its most serious consequences during early childhood, that is for the one to five years age-group. In this stage of weaning or post-weaning, which is normally a period of rapid growth and development, diets are deficient not only in protein and calories but also in certain vitamins and minerals. These deficiencies are directly related to high morbidity and mortality rates. I have no doubt that this symposium will provide an adequate forum for those engaged in different branches of food technology and industry to acquire, through a fruitful exchange of ideas, a better insight into the existing problems and work out suitable solutions.

In all developing countries, there has been a growing realisation that for economic achievement to be viable, it must be based, among other things, on a healthy community. There is also an increasing awareness that malnutrition is a crucial factor in perpetuating the health problems of a population. I am confident that the deliberations here will go a long way to accelerate the scientific and technological processes directed towards an increased production and wider utilisation of protein and nutritional foods, and developing a sound basis for both Government and industry to accept and carry out successfully the great responsibility of combating malnutrition.

As you are aware, for many years now, it has been the privilege of UNICEF along with FAO and WHO to work jointly with the Government of India, Indian industry, and US AID for improving the nutritional level in India. I am, therefore, very happy to announce that the UNICEF executive board has this month approved a project for the production and distribution of a low-cost protein-rich supplementary food for weanlings and young children in India.

UNICEF has allocated an amount of $ 780,000 equivalent to Rs. 58.5 lakhs to assist the project for two years. It is our sincere hope that this project will be successfully implemented and its benefits will reach the hundreds and thousands of homes of this growing country.

May I conclude by saying that UNICEF earnestly looks forward to your contribution to this symposium as well as to the larger efforts in this area, and to wish you all success in your deliberations.

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MECHANICAL DATA

Overall Page Size .. .. 22.5 cms. x 27.5 cms.
Printed Page Size .. .. 17.5 cms. x 22.5 cms.
Screen .. .. .. 100 and above

Mats & Stereos accepted

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RATES FOR ADVERTISING

Size	12 Consecutive Insertions	6 Consecutive Insertions	Single Insertion
* Front Cover (17.5 x 14 cms.) In Two Colours	Rs. 750	Rs. 790	Rs. 830
* Back Cover In Two Colours	600	630	660
Inside Front Cover	450	475	500
Inside Back Cover	375	395	410
Full Page	300	315	330
Half Page	175	185	195
Quarter Page	100	105	110

* 20% extra for each additional colour.
20% extra for special position.

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